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THESIS

DEVELOPMENT OF A CIVIL ENGINEER CORPS COMMUNITY PORTAL PROTOTYPE

by

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June 2002

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**DEVELOPMENT OF A CIVIL ENGINEER CORPS
COMMUNITY PORTAL PROTOTYPE**

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

The Civil Engineer Corps (CEC) is a relatively small Navy community consisting of approximately 1300 officers. Billet locations for the CEC range from Bahrain, Saudi Arabia to Keflavik, Iceland. CEC officers have a broad range of professional skills including contract management, public works management, Seabee operations, and other various fields. The information associated with these fields is abundant, and a common point of reference would be beneficial to all members. The community is wide spread and requires the ability to disseminate information as efficiently as possible to all corners of the world. Currently, information resources are available in both print and electronic forms in numerous locations. This thesis explores the concept of providing a single on-line location where CEC officers can go to access the information they need.

This thesis provides a summary of the development of a working prototype web portal, which grants the community access to the vast amounts of information available. The intent of the thesis is to explore the possibilities of how modern web-based technologies can be leveraged to provide a wealth of information to hundreds of officers around the world. In addition to the web development necessary for this prototype, the project also includes the development of the relational database to deliver data to the portal.

The research focuses on the methodology used to develop this portal prototype. The methodology used for the development of the project is a form of Rapid Application Development (RAD) including the following phases: definition, requirements, design, and implementation. Rapid Application Development is an iterative method of delivering an end product. The method focuses on delivery of small pieces of the whole and builds up to the final deliverable in an iterative fashion.

The completion of this thesis project demonstrates that a community portal is viable concept for information delivery to the entire Civil Engineer Corps. The results of this thesis can be used to pursue implementation of a similar concept for use by the entire community.

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LIST OF ABBREVIATIONS

ASP	Active Server Page
CEC	Civil Engineering Corps
CFML	Coldfusion Markup Language
CIO	Chief Information Officer
DBMS	Database Management System
DoD	Department of Defense
E-R	Entity Relationship
FK	Secondary Key
GUI	Graphical User Interface
HTML	Hypertext Markup Language
I-CASE	Integrated Computer Aided Software Engineering
IIS	Internet Information Server
JIT	Just In Time
JSP	Java Server Page
MS	Microsoft
NAVFAC	Naval Facilities Engineering Command
NAVPERSCOM	Naval Personnel Command
NITC	NAVFAC Information Technology Center
ODBC	Open Database Connectivity
P1	Civil Engineering Corps Community Directory
PCODE	Military Professional Code
PK	Primary Key
RAD	Rapid Application Development
SQL	Structured Query Language
VBSCRIPT	Visual Basic Script
WWW	World Wide Web
XML	eXtensible Markup Language

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I. INTRODUCTION & BACKGROUND

A. AREA OF RESEARCH

The Civil Engineer Corps (CEC) is a small Navy community consisting of approximately 1300 officers. CEC duty assignments are focused in three main areas: Seabee Construction Battalions, Contract Management, and Public Works Management. Members spend from eighteen months to three years on station at each duty assignment. Billet locations range from Bahrain, Saudi Arabia, to Keflavik, Iceland, and virtually every Navy and Marine Corps base in between. Moves are frequent, and job descriptions vary greatly. The information available to support this community and its many job descriptions is vast and wide spread. Currently, there is no single point of delivery for all of this information.

Advances in technology that have occurred over the last decade have made information delivery a much easier task. A substantially large portion of the population is likely to go straight to the internet when they want to find information on any subject. The global nature of the internet means that there are not too many places that you go where you cannot find a way to “get online” to access this vast information resource. The number of internet hosts is still growing at an amazing rate. (Zakon, 2002) The World Wide Web cannot be ignored as a means of information delivery.

Given this powerful information delivery tool, the Civil Engineer Corps has the opportunity to take advantage of a powerful information network that already exists. The community is in need of a central access point for all community-related information. Currently, the information is available in different locations and in different forms including web pages and print documents. New junior officers coming into the Navy need to have one location where they can go to find resources to help them develop their careers as CEC Officers. Senior officers, reporting to a specific job type in which they have not worked for several years, need a place to go to find the information necessary to renew their education in the specific area of the billet to which they are assigned. Personnel in the CEC detailing shop need a point of communication with the entire community. All community members need the ability to search for both personnel and

billets based on current information maintained by the detail office. The internet provides the capability to consolidate this information. The creation of this centralized resource could provide timesavings to all the officers in the community, as well as to community managers, who can go to a single location to deliver news and information. The concept of a centralized portal for the community is a viable option for accomplishing this task. The portal would initially act as an information delivery tool but could also set the stage for the future use of the portal as a resource sharing and collaboration tool.

B. RESEARCH ISSUES

The primary objective of this research is to explore the possibilities that the internet provides as an information delivery tool and to develop a proof-of-concept prototype showing the potential for a community portal. The research will focus on developing an appropriate delivery tool for the information available. Delivering large amounts of information in a single location can often overwhelm a user. The design of the portal must balance quantity with quality of delivery. Other portals will be evaluated for effectiveness during the development process.

Another critical issue to be considered is the design methodology to be used. Quick delivery of this prototype is essential, and the method chosen to develop it will affect the possibility of quick development. Options considered include a classic waterfall approach, a spiral methodology, an incremental approach, or rapid application development. Rapid application development will be used as it incorporates the best aspects of the other methodologies into a single approach. (Osmundson, 2002)

A final issue of great importance that must be studied is the data model necessary to support the delivery of this information. This is of utmost importance and will consume a large portion of the project development. The information to be delivered via the portal includes personnel information, information resource links, billet information, news, awards, and other information as discovered throughout the development of the project. This information is highly suited for database delivery. The research will concentrate heavily on the development of a data model appropriate for the support of this data.

C. SCOPE

The scope of this thesis is two-fold. The end goal of the project is to deliver a working prototype of this portal concept and evaluate the web as an information delivery tool. In order to accomplish this goal, the work will be split up into two sections. The first major area of focus will be the relational data model. The model will support the development of the working Microsoft Access database to support the functional prototype portal. Information contained in the database will be of numerous types including, but not limited to, personnel information, billet information, news updates, community awards, and information resource links. The second major focus area of the thesis will be the development of the working prototype portal and integration with the database mentioned previously. The thesis will demonstrate the viability of the community portal concept and open the door for the future exploration of such a project. This thesis will not include the implementation of the community portal for use by members of the Civil Engineer Corps; however, it will investigate the issues associated with such an effort.

D. METHODOLOGY RESEARCH

Determining a development methodology is critical to the success of any information systems project. In order to determine a proper development method for this project, a brief review of the three primary development methodologies is provided below. A system development life cycle (SDLC) is a logical process by which developers build information systems to solve business problems and/or needs. A methodology is the physical implementation of the life cycle, and a true methodology should encompass the entire SDLC. (Whitten, 1998, pp. 72-73) The three methodologies to be considered are Waterfall, Incremental, and Spiral. This is not an all-inclusive list. Rather, it is a list of general development categories. The strengths, weaknesses, and implied risks of each will be considered. An extensive list of modern development methodologies can be seen at <http://www.itmweb.com/methodology/wmethod.htm>.

1. Waterfall

a. Strengths

- The waterfall method is the quickest and most straightforward method by which to obtain a product.
- From a manager's point of view, the waterfall design methodology is easier to manage because of its linear nature.

b. Weaknesses

- Because of the simple, straightforward nature of the waterfall method, it has limited flexibility throughout the design process. This creates a need for specific, concrete requirements determination at the beginning of the project.
- In addition, the waterfall methodology does not lend itself to segmented systems development.

c. Implied Risks

- If requirements are not well defined, the project could fail due to lack of direction, because its linear nature does not allow for course changes.
- If a system is large and cumbersome with many parts, this method is likely to fail because of its inability to deal with segmented systems.

2. Incremental

a. Strengths

- Incremental design methods provide some additional level of flexibility during the design process.
- This flexibility and the non-linear nature of this methodology make it better suited to larger, segmented systems.

b. Weaknesses

- Because of the iterative and flexible nature of incremental methods, development using this method tends to be more time consuming.
- Requirements need to be firm but not concrete in order to use this design methodology because, although less rigid, it has limits to its flexibility.

c. Implied Risks

- In a project with fixed time duration, this method can lead to failure due to its iterative nature, which is time consuming.
- Requirements that are not concrete can lead to project failure because the method is not infinitely flexible to change.

3. Spiral

a. *Strengths*

- Spiral design and development methodologies allow the most flexible process for software creation and implementation.
- This methodology is non-linear and iterative in nature, which makes it ideally suited for large multi-part systems without concrete requirements.

b. *Weaknesses*

- The fact that requirements do not have to be well defined for this process tends to make this the most costly method of software development because of the many changes in direction throughout the project.
- Both of the strengths listed for this methodology also lend to its weakness, in that, they cause the development process to be long and drawn out.

c. *Implied Risks*

- The flexible nature of this evolutionary methodology allows for the possibility of both cost and schedule overruns.
- User interaction in the iterative development process is critical and if insufficient could cause project failure. (Sorensen, 2002)

4. Other Methodologies

The previous section discussed general design methodologies available for development. In addition to these, numerous methodologies are variations of the aforementioned. A short sampling of these other methodologies include Rapid Application Development, Component Assembly Model, and Concurrent Development Model. This is by no means a comprehensive list as the number of methodologies is very long. New unnamed processes are created often, because often no one methodology suits the needs of the development team. (Osmundson, 2002)

E. METHODOLOGY SELECTION

In any information technology project, the method of development can be critical to the success of the project. A form of Rapid Application Development (RAD) has been chosen as the methodology for this project because of its quick delivery time and focus on iterative development of small individual parts of the whole project. (Creative Data, 2002) Rapid Application Development is not as clearly defined as some other development methodologies. There are a few basic principles: joint design teams, integrated computer-aided software engineering tools, and an iterative process. The

focus of RAD is fast, iterative development. (Harris, 1997, pg. 1-1) Small portions of the project are incrementally developed with the result being a complete and usable product. Rapid Application Development has the strength of a classic waterfall methodology with its structured development phases, but it also has the advantage of iterative design phases similar to a spiral approach.

The methodology to be used is being called a form of RAD because it does not follow the basic principles very closely. Joint development teams will not be used because a single person is doing the development; and CASE tools will not specifically be used since the project is to be delivered as a web product and is relatively small. The tools used for this development are discussed in the next chapter. As was mentioned previously, design methodologies are very numerous and often modified to fit the needs of the project. However, follow-on work to this project could utilize the additional principles of RAD more closely as the magnitude of the project would be much greater. This development will be broken up into four phases: definition, requirements, design, and implementation. A graphical representation of the methodology to be used can be seen in Figure 1.

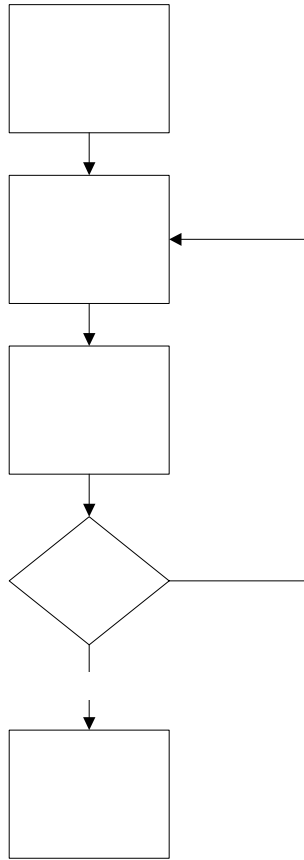


Figure 1. Development Methodology

The definition phase is focused on identifying the users of the system, determining the need for the project, and identifying major functional areas of the system. The requirements phase will be used to determine specific requirements of the system. The entity relationship diagram to support the portal will be developed during this phase in addition to a general site plan for the portal.

The design phase will include the development of the database schema, including all entities and their attributes. It will also include the detailed site plan for development of the portal. This phase is iterative and often overlaps and interacts with the requirements phase. Interaction and repetition between the requirements and design phases is what separates this methodology from a traditional waterfall development process. During the multiple requirements and design phases, the project will progress

from a paper concept to a working prototype through development cycles for each part of the system including the database and individual segments of the portal. Each iteration of requirements analysis and design will focus on an area of the project and work towards the end goal of a single integrated system.

Since RAD methodology is being used, iterative development is essential. The requirements and design phases will be repeated as necessary to accomplish the development of each segment of the project. An initial focus will be placed on defining the general requirements, and they will be re-evaluated during each phase of the development.

The implementation phase deals with the final details of the project. It involves the actual activation of the prototype system and the issues involved in making it a successful evolution. Final troubleshooting of the integrated system occurs during this phase. This phase will be limited in scope for the purpose of this research, as this is only a prototype development.

Overall, this methodology should provide a quality product in the shortest amount of time. Rapid application development is a quick methodology, but this does not mean taking shortcuts. (U.C. Davis, 2002) It merely means efficient use of time. Planning is still critical to the success of the project, and the following chapters will focus on the very important task of requirements determination.

F. ORGANIZATION

This thesis will be organized in the following manner:

1. Chapter I – Introduction

This chapter introduces the goals of the research and details the methodology to be used for the development of the project.

2. Chapter II – Project Definition

This chapter will deal with the need for the project, identification of users, and major functional area determination.

3. Chapter III – Project Requirements & Design

This chapter is where the project begins to take shape and is the focus of the research. Specific requirements will be identified for the prototype system. It deals with the actual development of the data model including all entities and attributes as well as the web interface creation. The chapter will be divided into 5 development phases, which will be defined in more detail later.

4. Chapter IV – Project Implementation

This chapter is limited in scope. Two primary issues will be addressed: the final integration of the database and web portal and factors to be considered for implementation of a similar concept for use by the entire community.

5. Chapter V – Conclusion

This chapter summarizes the project and recaps lessons learned, in addition to recommending areas of future study.

G. BENEFITS

The Navy as a whole is experimenting with the use of portal technology. Naval Facilities Engineering Command is specifically working on a portal concept to support the entire NAVFAC community. This research will provide ground level insight into some of the issues associated with developing an information delivery tool. This research will be useful in adding to the collective knowledge of the community concerning web and portal technology. The product will provide the Civil Engineer Corps with a data model from which to work in order to move forward with this type of project using their choice of developer. The prototype will also provide a conceptual starting point for the development of a final product. The community will be able to build on the concepts delivered in this prototype and change them as they see fit to meet the needs at the time of implementation.

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II. PROJECT DEFINITION

A. GENERAL

A key element to a successful information technology project is a clear definition of the need for the project, the major areas of functionality for the project, and the users of the system to be delivered by the project. These elements become key in developing the requirements for the project. It is essential that any project meet the requirements for which it was intended. It is critical to deliver the requirements, but scope creep must be avoided. Proper definition of the project and adequate requirements analysis are effective strategies for accomplishing the project goals without allowing scope creep. This chapter deals with the clear definition of the project, while the next chapter will elaborate greatly on project requirements.

B. PROJECT NEED

The Civil Engineer Corps could benefit greatly from a central location for accessing community specific information. Two specific points make this need ideally suited to an online solution:

- Civil Engineer Corps officers are spread around the world.
- The amount of information available to be shared is tremendous.

Given these points, it is clear that a single web-based resource providing access to the vast amounts of information would be an invaluable asset. Additional information is needed regarding the information available for dissemination. The following paragraphs detail the specifics of information available for delivery to the community.

1. Personnel Information

The Civil Engineer Corps detailing shop (Naval Personnel Command Code 4413) manages all personnel information for the CEC. This information includes the management of all personnel in addition to the tracking of all command and billet information. This information is maintained in a legacy database system at Naval Personnel Command (NAVPERSCOM). This information was discovered during a site visit in 2001. The system is an old hierarchical database model, which is accessed by multiple legacy applications for managing navy Personnel. This system is nearly

impossible to interface on a real-time basis. For the purposes of this project, the goal is to provide members of the community with online real-time access to billet and personnel information. This will be accomplished with a separate system, which will maintain the data necessary to provide the information needed by the community. A concurrent research project is developing a method for sharing data between the legacy system and a modern relational database. For the purpose of the portal prototype, the data model developed will be similar to and created in conjunction with the other research project. The NAVPERSCOM system does not maintain any personal member information such as home address, spouse information, phone numbers, and other information, which is not directly related to the member's command. This additional functionality will be added to the capabilities of this system.

2. Professional Resources

Professional resources are another critical area of need for online information delivery. The community is diversified in background, qualifications, and job descriptions. There are three major areas of focus for professional development as a Civil Engineer Corps officer: Contract Management, Public Works Management, and Seabee Combat Warfare. Contract Management positions focus on the management and oversight of facilities construction and repair projects. Within this career field, there is a specific training path towards becoming an acquisition professional. The information associated with this training path is available in various locations. Public Works Management billets exist in order to maintain existing shore facilities. Standard training and manuals are available in order to assist members in becoming proficient in this field. The final area of focus for CEC officers is Seabee Combat Warfare. These billets are the only operational units to which members of the Corps are typically assigned. Warfare Qualification is a critical milestone during tours in Seabee battalions. Manuals and other general information are available in order to prepare members for their service in a Seabee battalion.

In addition to these specific areas of professional development, there are also the areas of Naval Officer Development and general Career Development. Resources are available to assist young officers in the planning and directing of their careers both as Naval Officers and as members of the Civil Engineer Corps.

3. Community Items of Interest

In addition to the previously mentioned personnel and billet information, the Civil Engineer Corps regularly disseminates items of interest to all members of the community. These items are delivered in biweekly updates, which include news updates, awards to members, and orders releases. This information is currently distributed using e-mail with a link to a web document.

C. GENERAL FUNCTIONALITY

Given the general description of information resources available, basic areas of system functionality can be outlined. The development of this portal prototype will focus on providing functionality in the following areas:

- Personnel information delivery and update capability.
- Professional information resources delivery.
- Community items of interest submission and delivery.

1. Personnel Information

Personnel information is currently maintained by NAVPERSCOM code 4413. Billet and personnel information has traditionally been delivered in a print media once a year. This information was limited to specific information related to members of the Civil Engineers Corps and their current billet information. As this was an annually printed document, it was out of date soon after its printing and release to the community. Recently, this information has become available online in a searchable format; however, the search capabilities are limited, and update capability is not available. This web portal will give access to personnel and billet information as well as personal contact information at the discretion of the member. The portal will also give users access to the system in order to allow them to update their personal information. The goal will be to provide extensive search capabilities, including various types of personnel and billet searches.

2. Professional Information

The purpose of this portal is not to duplicate existing information. Rather, the goal is making existing information readily available. Professional information is the most important area where this goal must be kept in mind. There are vast resources

available to deliver the professional development information needed by members of the Civil Engineer Corps. In order to make use of these extensive resources, members must be able to locate the information that they need. This portal will provide a jumping point to information resources available in other locations on the World Wide Web or intranets of various commands. Information will only be made accessible directly from this portal when no information is currently available in an online format for members of the community.

3. Community Items of Interest

Community interest items are currently delivered via e-mail to members of the CEC. This method of delivery was recently switched from a print-and-mail method, which had been used for several years, to an e-mail providing a link to a web document (<http://www.navfac.navy.mil/pao-graphics/CECbiweekly020607.htm>). Typical items of interest delivered to the community include news updates, award presentations, and orders releases. Other information is periodically delivered including promotion selections and other general community information as it arises. This project will make this information available on a continuing basis. Information will be delivered based on the current date and the date of the item of interest. Users will have access to the system in order to submit new items for delivery to the community via the portal.

4. Database Capability

The database to support this web portal concept is an essential part of the development. MS Access will be used to develop a relational database that will be easily accessible from the web development environment using an ODBC connection. The database development will include the creation of all tables and their relationships. In addition, Access will be used for the Database Management System (DBMS). This functionality will provide quick, easy access to the information and will not be dependent on a connection to the web. This capability will be useful in the early stages of development when populating the database with data in order to test web developments. The Access DBMS will also be usable for users of the system after development, and that fact will be kept in mind during the creation of the data access forms.

D. USER IDENTIFICATION

This project is limited in scope, as it is meant to be a proof-of-concept prototype demonstrating the viability of such a concept for the entire community. Because of this fact, the variety of users having access to the system will be limited. All users will be treated the same for access to the portal. The user experience will not be customized based on who the user is; rather, the users will be defined for the purpose of this project as a Civil Engineer Corps officer needing access to all of the above described information and capabilities. An advanced section will be available for the administration of some portions of the database. This will be the only distinction in users. The administration section will require different credentials in order to gain access. Figure 2 shows an interaction diagram between users and the elements of the system.

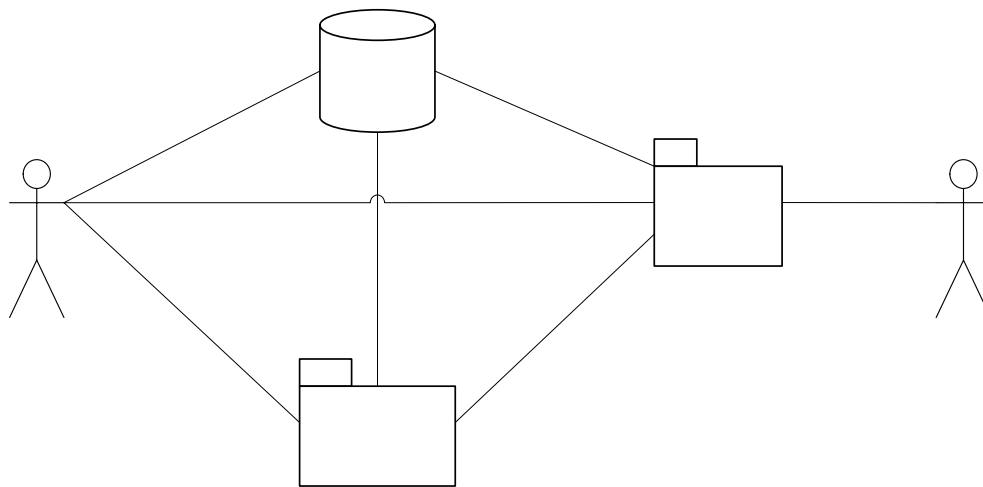


Figure 2. System Interaction Diagram

E. FEASABILITY

Based on the need and general functionality defined above, this project is viable for completion. The limited functionality of the prototype keeps the project simple enough to be completed in a reasonable time but capable enough to demonstrate the applicability of such a concept for use by the community.

There will be no additional cost associated with the development of this prototype. Hardware, including a workstation and a server, has been provided by the

Naval Postgraduate School for use during the thesis development. All software needed for development has been provided by the school, and there will be no labor cost associated with development because the manpower will be provided by student research time.

As mentioned in Chapter 1, this project is beneficial to both the Navy and the Civil Engineer Corps. The knowledge gained through the completion of this project will add to the collective capabilities of the Civil Engineer Corps. This will be beneficial during the upcoming development of an enterprise-level portal for use by all members of Naval Facilities Engineering Command including military, civilian, and contractor personnel.

III. PROJECT REQUIREMENTS & DEFINITION

A. DEVELOPMENT PLAN

Rapid Application Development is used in this project for providing a phased development process for the Civil Engineer Corps community portal. In order to properly take advantage of this methodology, the project must be broken down into segments. The segments can be developed independently. The breakdown of this development will partially reflect the core functional areas of the project but will not follow them exactly. There are three main areas of information delivery required for the portal: personnel information, professional information, and community items of interest. The project will be broken into five main modules for development purposes. The three main areas of information delivery will all represent a development phase. Two additional phases will be added to the list. The first phase is the development of the supporting database for the portal. The second phase is the creation of the portal home page, which is a culmination of information from each of the functional areas. Each phase will consist of requirements analysis and design. The development will progress in the following order with a majority of the requirements analysis being done in the first two phases.

- Phase 1 – Relational database development
- Phase 2 – Home page and interface development
- Phase 3 – Personnel information delivery
- Phase 4 – Professional information delivery
- Phase 5 – Community items of interest delivery

Two design approaches are available for the design of this project. A top-down approach involves starting with high-level strategic goals and working with these goals to develop a framework for the end product. A bottom-up approach is used in situation where a concept already exists for the end user system. This portal will be developed using a bottom-up approach. A general idea of what is to be provided to users of the portal already exists. This approach will allow for the derivation of design specifics from end level user requirements. (Kroenke, 2000, pp. 41-42)

B. GENERAL SITE PLAN

In order to grasp an overall view of the project scope, a general site plan is provided to establish a guide for development. This general site plan can be seen in Figure 3 and is representative of the layout of the web portal to be developed.

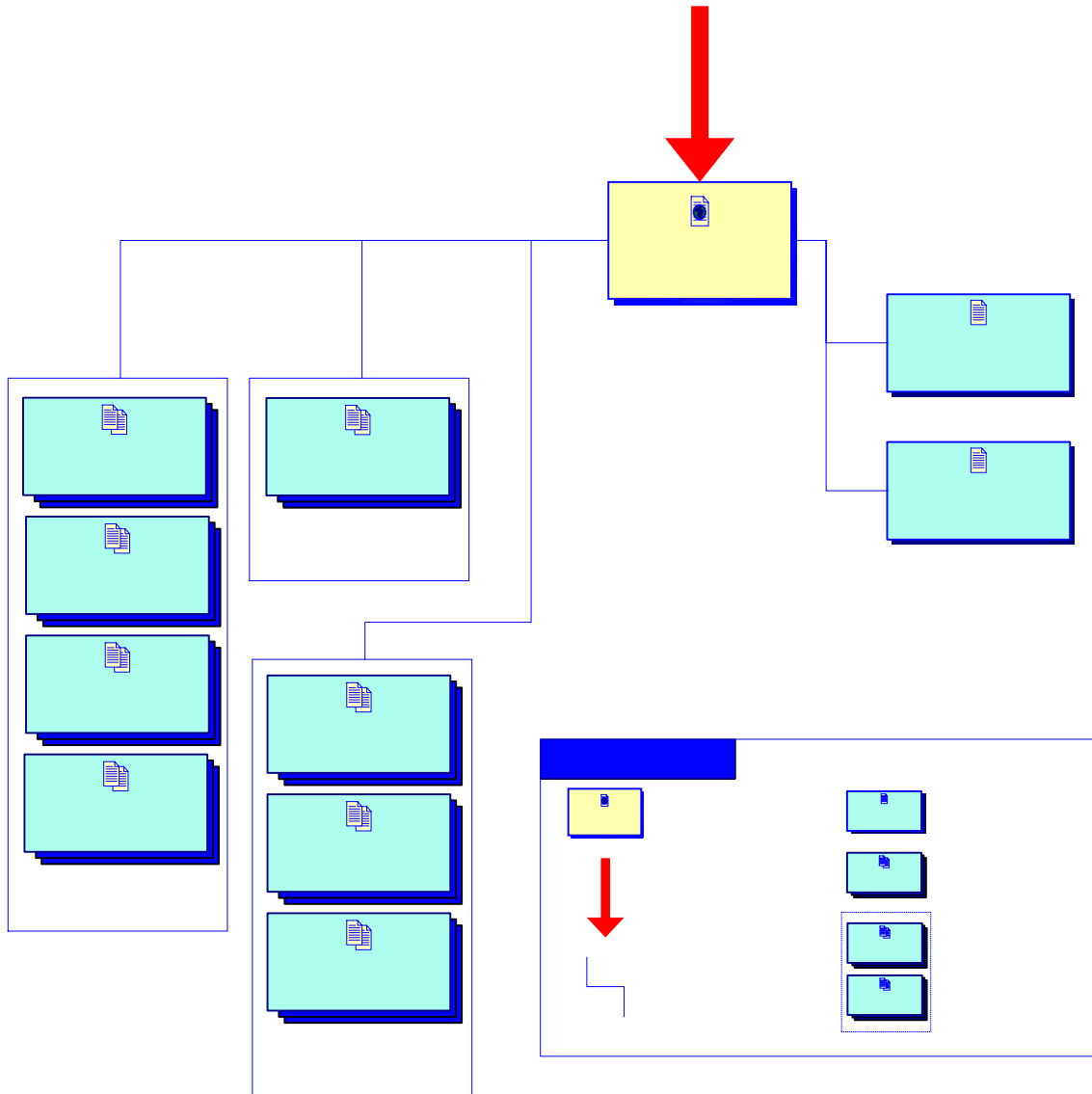


Figure 3. General Site Plan

This plan is derived from the general requirements set forth in the definition portion of this report. The plan does not include details of the specific number of pages on the site or any detail related to how those pages will interact. During Phases two through five, a detailed site plan will be developed based on the progression of the portal development. The general site plan details the core areas of functionality, a general plan for interaction between modules, and a representation of the project development phases.

C. DEVELOPMENT TOOLS

Web development tools have expanded greatly in their capabilities in recent years. Web pages, which could only be produced by an expert code writer just a few years ago, can now be created with simple point-and-click tools. Major offerings in the web development software arena include Macromedia Dreamweaver, Macromedia Ultradev, Microsoft .Net, Microsoft FrontPage, Adobe GoLive, Hotdog, and other lesser-known development tools. These same companies also offer other software in the arena of desktop publishing and photo editing, which can aid in the development of web graphics and other content. Some of these newer packages even provide the capability to write HTML code for graphics and actions created within the software.

In addition to the extensive list of web development and graphics editing software, there are also numerous portal development packages available for the integrated design and deployment of large enterprise-level portals. This list of tools includes BEA WebLogic, Microsoft SharePoint, IBM WebSphere, Oracle 9iAS, and Sybase Enterprise Portal. These tools are focused on enterprise-level application delivery. The definition of a portal in the business arena is migrating towards collaborative interactive sites with a focus on accessing enterprise applications. This project is focused on a more traditional information delivery model of a portal. The development is small in scale; therefore, portal development products will not be used for the creation of this prototype.

Based on previous experience Macromedia Dreamweaver, Ultradev 4 has proven to be an invaluable development tool in the creation of web pages and web-accessible database applications. This software will be used for the development of this portal. In addition, other software will be used for creation of the web content. Adobe Photoshop 6

and Macromedia Fireworks 4 are excellent resources for web graphic content development. Microsoft Visio 2002 will be used for the development of the entity relationship diagram and the site plan diagrams. Visio provides industry standard charting capabilities and interaction with web pages and databases. Visio was primarily chosen for this research work because of its high-level of compatibility with other products in the Microsoft suite. Its modeling capabilities are sufficient for this small project. There is only one additional capability that would be utilized on a project of this size – the ability to create a database directly from the model. Microsoft Access 2002 will be used for the development of the relational database that will be used to support the portal. Microsoft Access provides robust database capability for small applications.

D. GENERAL REQUIREMENTS

The final desired deliverables become a starting point for the identification of requirements, when using a bottom-up approach. Using the necessary deliverables as a point of reference for the derivation of requirements ensures that the system will be built from the bottom up with the end user requirements at the core. Initial requirements analysis will be focused on identifying all the functional requirements of the portal identified by development phase. Table 1 identifies these requirements. Each requirement will be discussed in detail in the appropriate development phase, and additional requirements will be identified in later phases of the project as necessary.

Phase 1 - Relational database development

- Store data in an easy-to-manage relational database
- Provide a normalized data model based on the information needs of the portal
- Provide database management capabilities

Phase 2 – Web portal home page and interface development

- Allow quick member search by last name
- Display missing e-mail address count
- Allow quick submission of missing e-mails
- Allow quick access to personal information updates
- Provide user friendly main interface
- Provide a common access menu structure
- Display recent community news
- Display recent community orders releases
- Display recent community award presentations
- Allow user login and session tracking

Phase 3 – Personnel information delivery tools development

- Allow activity searches
- Provide detailed activity search results
- Allow member searches
- Provide detailed member profile search results
- Allow billet searches

Phase 4 – Professional information delivery tools development

- Provide links to acquisition professional information
- Provide links to public works management information
- Provide links to Seabee combat warfare information
- Provide links to general CEC career development information

Phase 5 – Community items of interest information delivery tools development

- Deliver news
- Deliver award presentations
- Deliver orders releases

Table 1. Project Requirements

E. PHASE 1 – RELATIONAL DATABASE DEVELOPMENT

This phase, although not the primary focus of this project, is critical to the success of the prototype. The supporting database for any system can make information delivery easy or impossible depending on the design of the database.

1. Existing Data

The focus of this project is not to create a fully populated database. The goal is to create an ideal relational model for the support of the portal. Much of the data needed to support this information delivery tool is not available in a database format. Specifically, professional information and community items of interest are not maintained in a database. In fact, the list of professional information is not even compiled. The links are scattered over numerous sites across the World Wide Web. The final category of information to be stored is personnel information. This data is maintained by Naval Personnel Command Code 4413. As mentioned previously, this information is maintained in a legacy database system. The data is not stored in a relational model and is unavailable for any type of link to the system. That being said, the data can be extracted in a comma separated value text file, but again, the data is not relational and is difficult to manipulate.

Another thesis research project is underway currently to study the method by which the data can be linked or imported to a stand-alone system for use by the staff at NAVPERSCOM. Some data will be migrated from this system for functionality testing of the community portal, but a complete and accurate migration is beyond the scope of this thesis. This effort will be discussed in more detail in the implementation chapter. The database portion of this project will focus on the development of an efficient data model that meets the data requirements of the web portal not an existing database. This eliminates many of the many difficulties associated with database migration and/or population.

2. Data Model Selection

A data model type must be selected in order to meet the requirements of the project. Data models most commonly used in modern systems include hierarchical, object-oriented, and relational. Hierarchical is an older form of database used in many

older mainframe-terminal configurations. Object-oriented is the newest of these three options, but is complicated and often difficult to work with in creating a simple user-maintained database. (Date, 1990) Relational data models are commonly used in database implementations today. Relational models provide efficient storage of data in an easy to understand format. In a relational model, information is stored in entities, which are tables of “related” data. Information in different entities is related according to proper relationships. This method of data storage follows a logical pattern of organization, minimizes duplicated data, and eliminates certain processing errors generated by data stored in other ways. (Kroenke, 2000, pp. 17-18) The relational concept will be used for the development of this project.

3. Requirements Analysis

The requirements specifically related to the database development portion of this project are limited in quantity; however, the development of an efficient, easy-to-manage database is critical to the success of the portal concept. The requirements for this phase are simply stated as store data in an easy-to-manage database, provide a data model based on the information needs of the portal and provide database management capabilities.

The information identified as data requirements is derived from two primary sources. The first is the print version of the P1 Civil Engineer Corps directory. This document is a guide for identifying the information required for proper tracking of community personnel information. Two sample pages from this document are included in Appendix A. The second source for identifying possible data to be stored is the Civil Engineer Corps Bi-weekly newsletter. A copy of the June 7th issue is included in Appendix B. Other information identified as data requirements comes from the developer’s knowledge of the community and the requirements for the web portal.

In addition to the development of the data model and the Access database, database management must be included. For this project, the form creation capability of MS Access will be utilized. A Database Management system is necessary in order to provide access to and maintain the data. Additional database management will be provided to the end user through the web interface, and this will be discussed later in this chapter.

4. Database Schema

The exact details of a database are explained in detail using the schema. The schema includes the entities, attributes, domains, and the business rules for the database. The schema is a design for the database. (Kroenke, 2000, pg. 30) Based on the specific database requirements and the overall core functionality of the system, a database schema model can be developed. In order to begin development of the data model, a brainstorming session is necessary to identify entities to store in the database. Figure 4 shows the results of this session.

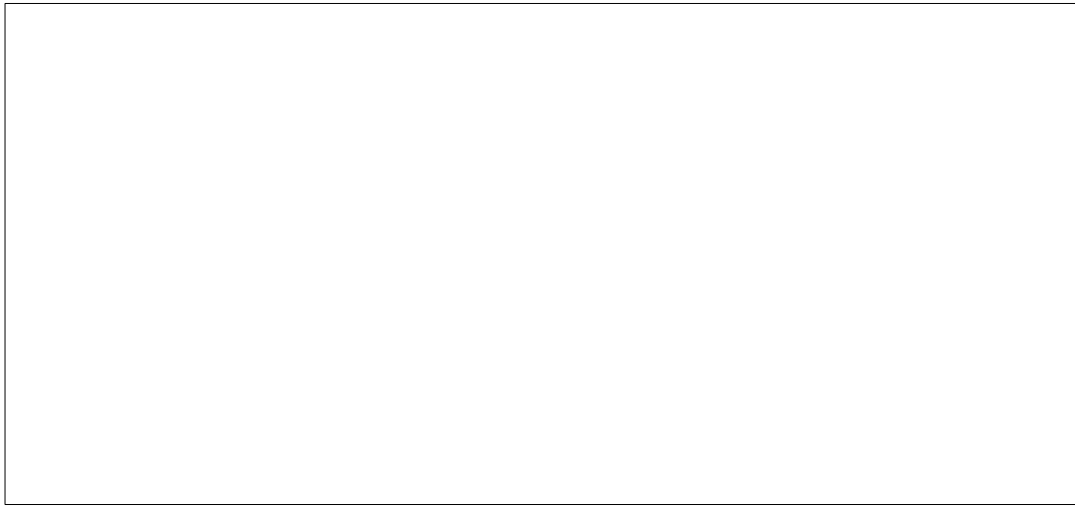


Figure 4. Brainstorming Session Results

The goal of the brainstorming session is to develop a list that will be refined and become the list of entities for the data model. The Entity Relationship Diagram can be developed based on a refined list. Based on the results of the brainstorming session and further consideration of data to be stored, Table 2 provides a list of entities that have been identified as primary for the data model. This list does not include intersection tables or lookup tables. These will be discussed in detail in the E-R Diagram section.

MEMBER	PHONE
BILLET	ADDRESS
ACTIVITY	EMAIL
ACTIVITY_PHONE	AWARDS
QUALIFICATION	NEWS
PCODE	LINKS

Table 2. Primary Entity List

a. E-R Diagram Creation

The primary information to be stored in the database is personnel information. This includes information related to members, activities, and billets. Additional information included in the model is related to the submission of news updates, awards, and links to items of interest for the community.

The simplified Entity Relationship Diagram is shown in Figure 5. It shows the relationship between all of the primary entities for this model. The detailed E-R Diagram with all attributes defined will follow. The logic for the Simple E-R Diagram is as follows.

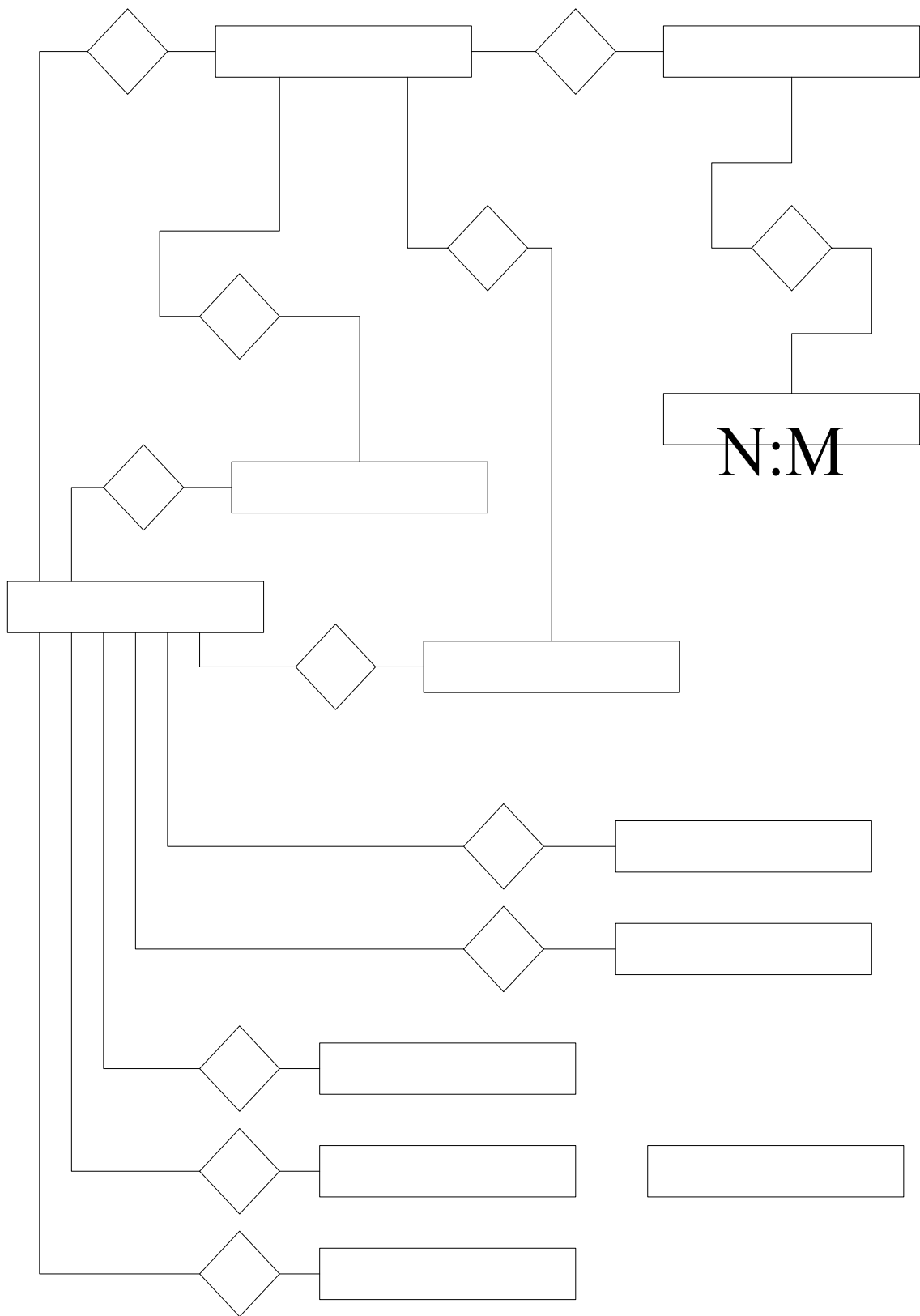


Figure 5. Simple E-R Diagram

The MEMBER entity represents a member of the Civil Engineer Corps. Members have addresses, phone numbers, and email address. Each member can have from zero to many of each. ADDRESS, PHONE, and EMAIL are the entities that represent this data. All addresses, phone numbers, and email addresses must be associated with a member, but a member does not have to have any of the above. Each member can have many Pcodes and qualifications represented by the PCODE and QUALIFICATION entities. There are many qualifications and pcodes. Each member can have from zero to many of each. Pcodes and qualifications need not have a member.

Members are assigned to billets represented by the BILLET entity. Each member must be assigned to a billet, but a billet does not have to have a member. A member can be assigned to many billets during his or her career. Billets are associated with an activity represented by the ACTIVITY entity. An activity can have many billets, but a billet can only be associated with one activity. An activity is not required to have a billet, but a billet must be associated with an activity. Each activity can have from zero to many phone numbers stored in ACTIVITY_PHONE. A billet can have one pcode as represented by the PCODE entity, but this is not required. A pcode does not have to be associated with a billet. Each billet can have a primary and a secondary qualification requirement. This information is stored in the QUALIFICATION entity. A billet is not required to have any qualifications, and qualification does not have to be associated with a billet.

Members can submit community news updates, which are stored in the NEWS entity. A news update must be associated with the member who submitted it, but a member does not have to have submitted any news updates. Award announcements can be submitted for members of the community and are stored in the AWARDS entity. Members can receive from zero to many awards, and an award has to be associated with a member. Links to professional items of interest are to be stored in the LINKS entity, but this information is not associated directly with any other entity.

Appendix C provides the detailed database schema in tabular format. The tables include all of the entities with their attributes and allowable values (domains). The tables indicate PK and FK relationships, which have been identified as unique, non-data

carrying integers in each entity. The information provided in the appendix is very comprehensive; however, the information is best presented in a graphical format. Figure 6 is the detailed entity-relationship diagram. It displays all of the information from the simple E-R Diagram, but also includes the attributes for each entity, the intersection tables necessary for many-to-many relationships, and the lookup tables.

b. Business Rules

The final element of the database schema is the business rules for the database. In this model, most of the data is constrained by the model itself therefore limiting the number of business rules necessary. Uniformity of data input is the primary requirement that is to be controlled by a business rule. In order to accomplish this in certain data fields, lookup tables are to be created. Entities will be created for the following information: designator, rank, type of address, type of phone number, type of e-mail address, category of web link, category of billet, state, sex, suffix, and race. These entities will be used as lookup tables (shown in Figure 7) in order to control values entered for specific values in other entities.

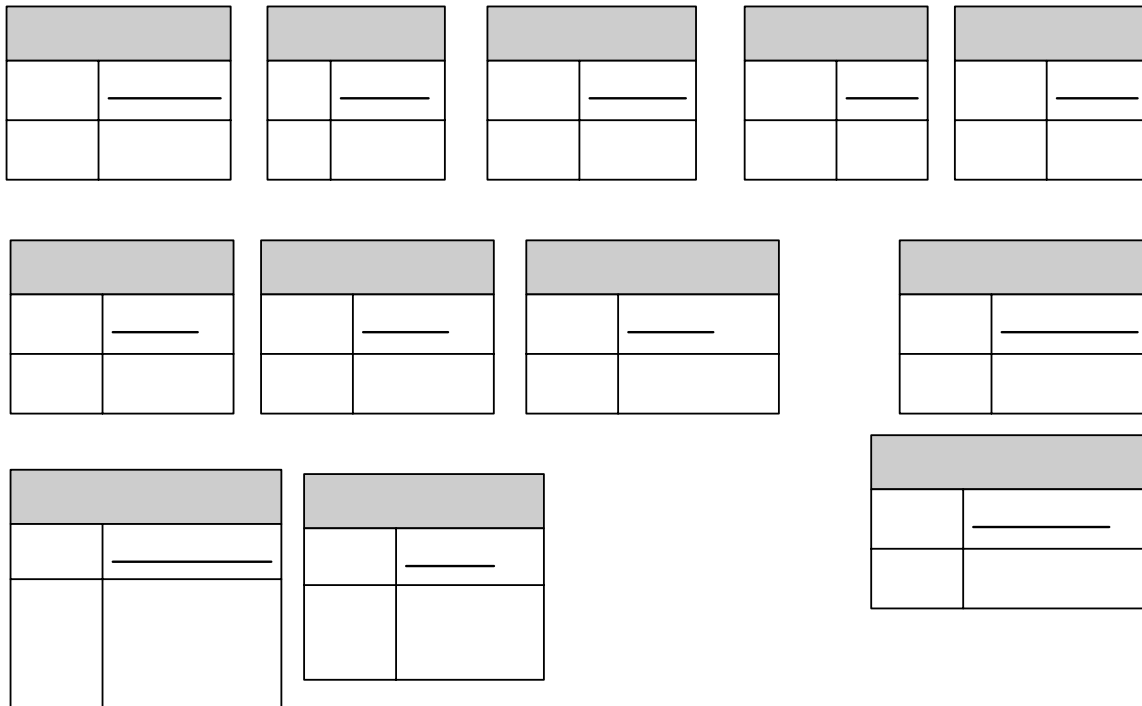


Figure 7. Lookup Tables

Each of the entities will be prefaced with “lookup” for ease of identification. Usernames will be controlled by a business rule for this portal. All usernames will be constrained to first initial, middle initial, and last name. As an example, Neil Christopher Rader would have “ncrader” as a username. This business

rule will not be enforced by the system. The input of usernames will be controlled by the database manager when inputting new users into the system. Duplicate values must be avoided in order to successfully management portal login accounts, which will be discussed in detail later.

c. Normalization

The goal in creating this relational model was to create an efficient database that eliminated data duplication wherever possible. In order to do this the database needs to be normalized to the maximum extent possible. Normalization is the process by which modification anomalies are eliminated from the database. The goal is to obtain Domain Key/Normal Form (DK/NF) for the entire database. This is the highest level of normalization and will prevent all modification anomalies. “A relation is in DK/NF if every constraint on the relation is a logical consequence of the definition of keys and domains.” In order to make this definition more clear a breakdown of the three primary definitions in this statement are provided below.

A constraint is defined as any rule governing the static values of an attribute. A key is a unique identifier for record in a table. The domain for an attribute is defined as the meaning of the attribute and the physical list of values it can have. In simpler terms “...a relation is in DK/NF if enforcing key and domain restrictions causes all of the constraints to be met.” (Kroenke, 2000, pg. 126) This model was successfully normalized to a high degree; however, two specific issues were not dealt with.

The first and most important of these is the relationship between billets and activities. In reality this relationship should be able to be represented using a many-to-many relationship. A set of data could be defined such that a finite list of billets could occur at numerous activities. Instead, the relationship is represented as a one-to-many relationship with one activity having many billets. The reason for this denormalized state is the data available for the population of the database. A single job description might occur at two different locations, but its description in the NAVPERSCOM system might be different from one activity to the next. For an example, a public works officer billet will be considered. Each activity that has a public works officer will have a separate billet listed in the legacy system. One location may call this billet the public works

officer, another may simply list it as PWO, and still another may simply list it as the facilities director. This created a problem with data migration; therefore, this relationship was not normalized.

The second issue is related to the use of the designator lookup table. The database was created and the project was well underway, when this information was identified as something that had the potential to change. The data is stored in the MEMBER and BILLET entities and merely looked up from the lookupDESIGNATOR table. If the information for a designator were to change data updates would be required to both the MEMBER and BILLET tables. The proper implementation for this data would be to relate members and billets to designators using a foreign key in these tables. The implementation would be similar to the relationship between billets and Pcodes. In fact, the data in the pcode table would soon be required to go through this very update because navy pcodes were changed recently.

5. Database Creation

With the conceptual design of the database complete, the Microsoft Access database can be created. Microsoft Visio was used as the tool for creation of the E-R diagram. The I-CASE tools mentioned earlier could have been beneficial in this primary area. More advance integrated software tools have the ability to take an entity relationship diagram and automatically create the database using the schema. Unfortunately, Visio does not have this capability. For this project, the Microsoft Access database was created manually in order to duplicate the database schema. Fortunately, Visio does have the capability to refresh a conceptual data model drawing by connecting to the database. This capability can be used to refresh the E-R diagram when any future changes are made to the database. With all tables and relationships created in MS Access, the database can be populated with a limited sample of data for demonstration purposes.

6. Database Population

The goal of this project is not to populate a fully accurate database; consequently, a simple data set will be created from existing data in order to demonstrate the capabilities of the system. Two flat files from the mainframe system at NAVPERSCOM

were used to populate approximately 1300 members, 450 activities, 1200 billets, and 1100 sets of orders. This data set is not complete and is not up to date with all current member assignments, but the data is sufficient for prototype testing. The data chosen for migration was selected for ease of integration. Additional information was manually input into the system including addresses, phone numbers, e-mail address, and activity phone numbers. Member qualifications and pcodes were also migrated from the test files provided by NAVPERSCOM. Finally, a select group of awards and news stories were input from recent CEC bi-weekly newsletters, in addition to links to several sites with professional information for CEC officers.

7. Database Management

A database is useless if the information in it cannot be maintained in an intuitive user-friendly manner. Microsoft Access was chosen as the DBMS for this prototype project. Given this fact, the form creation capability of Access was selected as an interface for the database manager. Forms will be created to give the administrator access to add, edit, or delete all records in the database using the GUI interface.

8. Form Creation

In order to accomplish the goal of providing add, edit, and delete capability for all information in the database, several forms will need to be created. In addition, a central switchboard form will be created to grant access to each of the individual forms. The following is a list of all forms to be created, and Figure 8 is a graphical representation of how they interact with one another.

- Main Switchboard
- Information Resources Switchboard
- Community Member Management
- Shore Activity Management
- Shore Billet Management
- Member Orders Management
- Web Link Management
- Award Submission Management
- News Submission Management

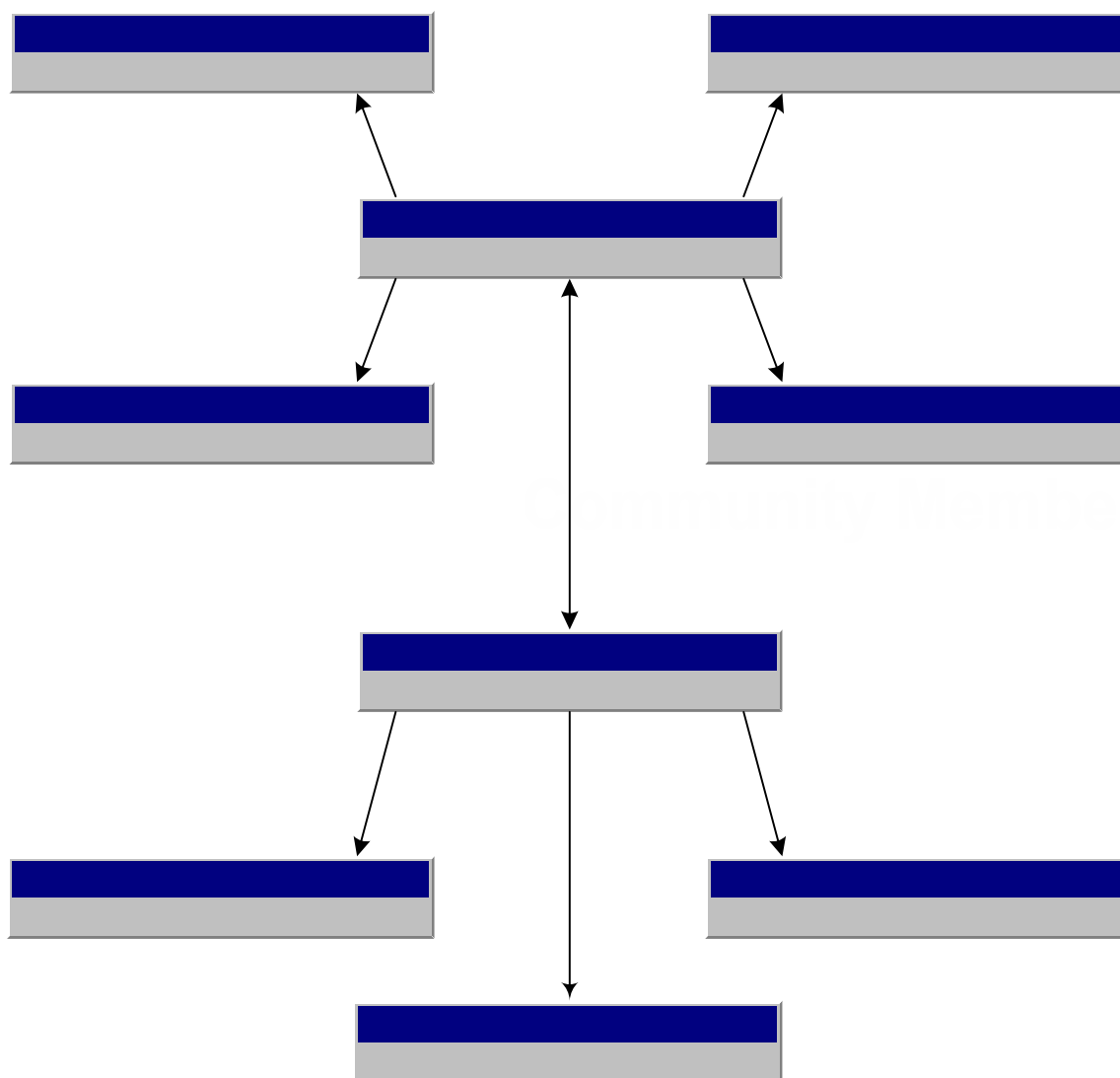


Figure 8. Form Interaction Diagram

These forms are created using automated capabilities in Microsoft Access and then customized for more logical and meaningful arrangement of data. The main switchboard is shown in Figure 9, and the Community Member Management form is shown in Figure 10 as an example of a typical management form. All other forms are shown in Appendix D. The forms provide access to all information in the database and implement the primary business rule, which is use of the lookup tables mentioned earlier. The forms limit the choices in these fields to only those available in the associated lookup table. Figure 11 shows an example of this capability.

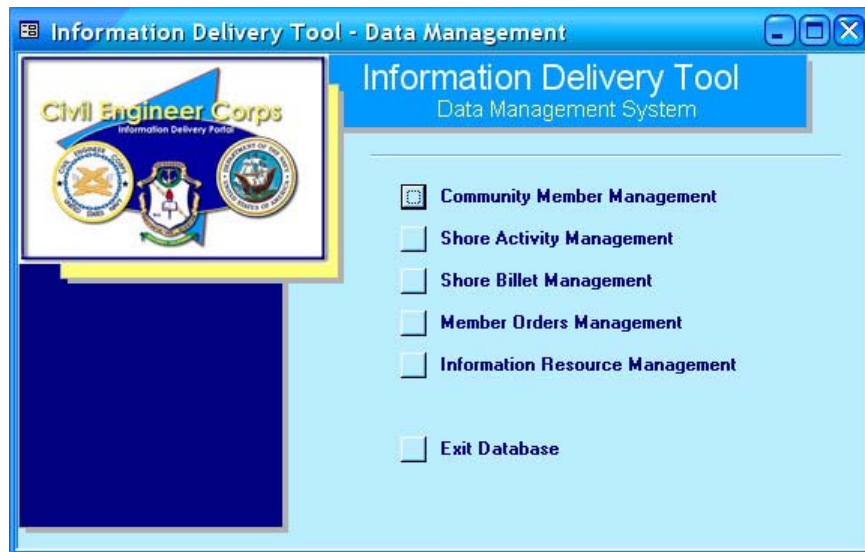


Figure 9. Main Switchboard

Community Member Management

Rank	First Name	Middle Name	Last Name	Suffix	Nickname
LT	NEIL	CHRISTOPHER	RADER		CHRIS

Social Security Number	Year Group	Designator	Race	Sex
410-35-9430	1997	5100	C	M

Username	Password	User Level
NCRADER	*****	ADMINISTRATOR

E-Mail Addresses

Type	E-Mail Address
Work	ncrader@nps.navy.mil
Home	ncrader@msn.com
Home	ncrader@hotmail.com
Other	ncrader@lycos.com

Phone Numbers

Type	Country Code	Area Code	Number	Extension
Home	1	831	3944031	
Work	1	831	6562911	
Mobile	1	831	2772298	
DSN			8782911	
*	1			

Addresses

Type	Street	City	State	Zip	+4	Country
HOME	220 TUNISIA ROAD	SEASIDE	CA	93955		UNITED STATES
WORK	1 UNIVERSITY CIRCLE	MONTEREY	CA	93943		UNITED STATES
*						UNITED STATES

Record: 958 of 1319

Figure 10. Community Member Management

The screenshot shows a software window titled "Shore Activity Management". It contains a form with several sections:

- Activity:** A text field containing "COMNAVFACENGCOMHQ WASH DC".
- Street Address:** A text field containing "COMMANDER".
- City:** A text field containing "WASHINGTON NAVY YARD".
- UIC:** A dropdown menu showing "00025".
- Claimancy:** A text field.
- 10 Digit Code:** A text field containing "3361-0020-00".
- State:** A dropdown menu showing "DC".
- Zip:** Two text fields containing "20374" and "5065".
- Country:** A text field containing "UNITED STATES".
- Region:** A dropdown menu with a list of options:
 - NAVAL DISTRICT WASHINGTON (selected)
 - ATLANTIC DIVISION
 - EFA MEDITERRANEAN
 - EFA CHESAPEAKE
 - EFA NORTHEAST
 - SOUTHERN DIVISION
 - EFA SOUTHEAST
 - EFA MIDWEST
- Number/Extension:** A section with two columns: "Number" and "Extension". The "Number" column has values "59000", "59000", and "51463". The "Extension" column has empty text boxes.

At the bottom of the window, there is a status bar that says "Record: 1 of 450".

Figure 11. Lookup Table Example

7. Database Testing

The final step in the database phase of the project is the testing phase. Both the data model and the data management forms require testing. In order to accomplish this task, several additional records were put into the database using the management forms created in the previous section. During the input of these records, various minor changes to database field properties and form properties were identified and corrected. The result is a working system that allows access to all data, maintains rules of data integrity required by the E-R diagram, and properly implements the primary business rule required for this development. Several selected users were allowed access to the system in order to confirm its capabilities.

F. PHASE 2 – HOME PAGE AND INTERFACE DEVELOPMENT

This phase is the development of the of the primary access point for users of the portal. The development includes work on the home page for the portal and the considerations required in creating the entire site. It is the hub of the portal and is essential to success of the prototype.

1. Server Model Selection

In order to begin work on the creation of a database-driven website, a web server model must be selected. Dreamweaver, Ultradev 4 allows for the choice of three different models: Active Server Page (ASP), Java Server Page (JSP), and ColdFusion Markup Language (CFML). The server model specifies by what means the web pages will interact with the database server. Each of these models is similar in functionality in that they all deliver html code to the end user desktop.

- ColdFusion was created by Allaire and is now owned by Macromedia. ColdFusion boasts its just-in-time compiler, which renders the CFML into the pages that are served. The CFML code encompasses a combination HTML and XML code. (searchDatabase.com, 2002) ColdFusion also boasts a very high level of interoperability between platforms and browsers. (Brooks-Bilson, 2001, pp. 1-5)
- JSP, as the name implies, delivers dynamic content using java applets. A Java Server Page calls a Java program that is executed by the web server and then sent to the user. (searchSolaris.com, 2002)
- An Active Server Page is a regular HTML page that contains one or more scripts to be processed by the server. ASP is a feature of Microsoft Internet Information Server (IIS); however, since the scripts are interpreted on the server side, an ASP page can be delivered to almost any browser. The scripting language used can be either JavaScript or VBScript.

It is also possible to run scripts on the client side, but this is not recommended because it can cause problems with browser interoperability. (searchWin2000.com, 2002) Each of these tools provides access to essentially any standard database connection.

ASP is to be used as the server model based on the developer's knowledge of the model, the availability of a Windows 2000 Advanced Server with IIS 5.0, and the capability to perform server-side scripting with HTML code delivered to the desktop. JavaScript will be used for the scripting language. Although the user is more familiar with VBScript, there are more resources available for custom JavaScript expertise on the web. The following section gives a brief overview of the ASP model.

2. Active Server Page Model

Since ASP has been chosen as the server model for this development, a brief description of the mechanics behind its operation is provided here. Figure 12 gives a graphical representation of the client server relationship involved in the model.

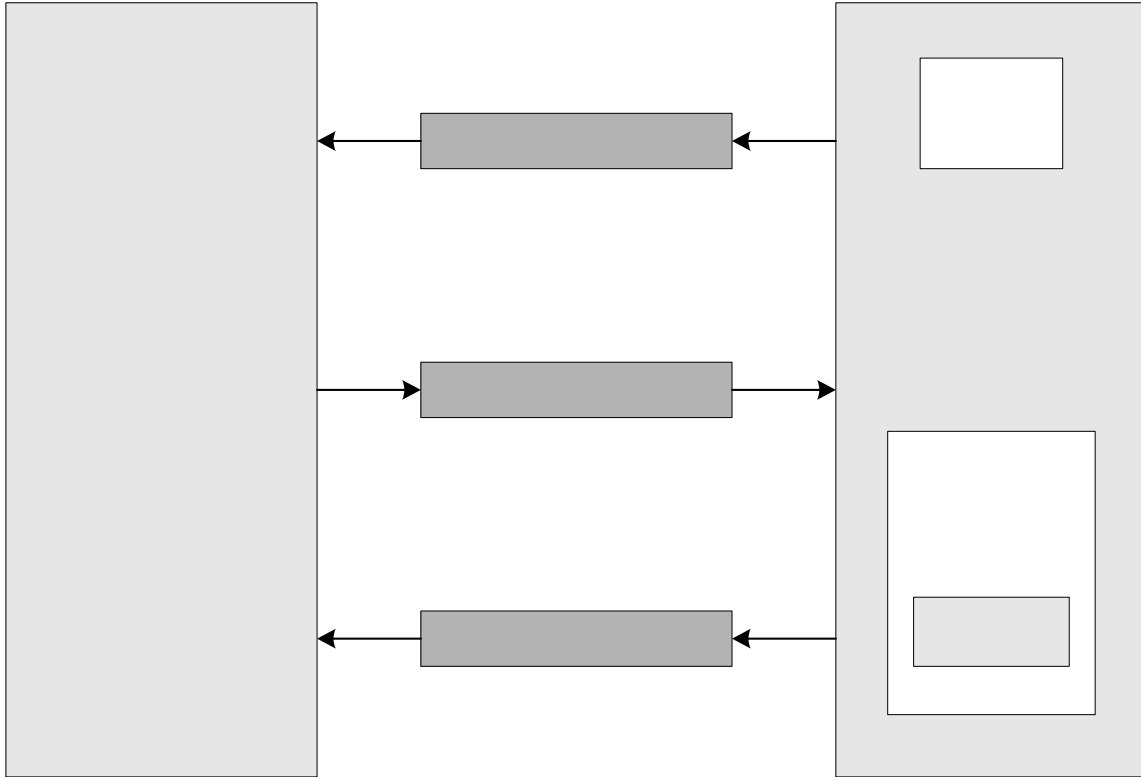


Figure 12. ASP Server Model

There are six Active Server objects. The Request object and the Response are of primary concern. The request object deals with requests from the client sent to the site or application most likely submitted from an HTML form. The Response object deals with the server response to the client browser. The Application and Session objects manage information about the application currently running. This unique instance of the application is called a session.

TheObjectContext object is used for setting timeout properties for scripts and converting text into HTML or URLs. The server object is self-explanatory, but the CreateObject method of the Server object is of great importance. This method in

conjunction with the ActiveX Data Object (ADO) allows the ability to create, move, alter, or delete records in the database. This functionality is key to the success of a data-driven web page. (Kauffman, 1999, pp. 12-13)

3. Requirements Analysis

A review of the requirements previously identified for this portion of the project is necessary. They were defined as:

- Allow quick member search by last name
- Display missing e-mail address count
- Allow quick submission of missing e-mails
- Allow quick access to personal information updates
- Provide user friendly main interface
- Provide a common access menu structure
- Display recent community news
- Display recent community orders releases
- Display recent community award presentations
- Allow user login and session tracking

Based on this list and the success of the data model creation, the web application can be created to meet the prescribed requirements. One additional requirement not previously identified is the need for site accessibility. DoD mandates in Section 508 that all sponsored sites be accessible to everyone. (Section 508, 2002)

4. Database Integration and Connection

The first need for the creation of a data-driven web application is the connection to the database. This process has been streamlined and is now an integrated part of Microsoft operating systems. Open Database Connectivity (ODBC) is the method that will be used for this connection. ODBC allows for connection to essentially any standard database including SQL Server, Oracle, Access, and others. Dreamweaver automatically recognizes these connections and sets them up for use in newly created ASP pages.

For connectivity to the database for use on the web, two primary methods can be used. Both of these methods involve the use of the Structure Query Language (SQL) for requesting and submitting data to and from the database. SQL is the standard for

information interchange between computers. It works on essentially any relational database, and runs on almost any computer or operating system. This again supports the goal of interoperability. SQL is a data access language that uses, SELECT, INPUT, DELETE, and UPDATE commands to manipulate the database. In addition other statements like WHERE and GROUP BY clauses can be used to specify criteria for the data manipulations. A detailed explanation of every aspect of the Structured Query Language is beyond the scope of this document, but a sample SQL statement and its explanation are shown below. In addition, *Database Proccessing* by David Kroenke is recommended as an excellent introductory text for the subject.

```
SELECT DisplayDate, NewsID, Title, News  
FROM NEWS  
WHERE (((Month([displaydate]))=Month(Date())))  
ORDER BY DisplayDate DESC
```

This statement requests the display date, ID, title, and story (News) from the table NEWS for all news stories where the display month in the record is the same as the current month, and then sorts the data from most recent display date to oldest display date. This will provide all news stories marked for display in the current month and display them with the newest story on top.

The first method by which dynamic web pages can gain access to data through the development environment in Dreamweaver is directly through recordsets. A recordset is the set of data that a specific ASP uses. Each ASP page can make use of multiple recordsets if needed. Using this method, the developer directly connects to the database and writes the SQL statement directly into the recordset criteria.

The second method of data access using the combination of Dreamweaver and MS Access is to develop the SQL queries in the Access database. The process is similar to the first method. However, by creating the queries in the database instead of Dreamweaver, the developer has direct access to the data that will be used by the ASP page without the use of the web development environment. This practice is also beneficial in that it provides easy manipulation and editing of these queries, if they

should change at any time. This method of database query will be used for this project because of the maintainability that it provides.

5. Login, Users, and Session Variables

As was seen in the creation of the database earlier in this chapter, login usernames, passwords, and user levels will be stored for all members of the community. Using this method gives the website the capability of restricting access to members who are listed in the database and the ability to customize content for the current user. The login page can be seen in Figure 13.



Figure 13. Portal Login Page

The user level field, although populated in the database, will not be used for this development. Due to time constraints and the availability of the MS Access front end for the database, the administrator portion of the web portal will not be created at this time. This variable would have given the additional capability of granting access to administration pages only to those who had an administrator user level.

Session variables are the means by which the ASP server model tracks the user while connected to the site. The username and password are stored in a session variable and carried by the server throughout the user's active navigation of the portal. If a user logs out of the portal, closes his or her browser, or is inactive in the site for more than the session timeout period, the session variables are dropped. The session variables are initially stored after a successful login authenticated to the approved list of users in the database. A session variable can then be pulled to uniquely identify the current user to a database recordset. The use of this functionality will be demonstrated in the Member Record Updates section.

6. Web Template Creation

Through the creation of numerous websites, the developer has discovered that the use of web templates is highly desirable for the creation of sites larger than a few pages. A web template is used in the development environment as a starting point for the creation of new pages. Essentially, it gives all the pages the same look and functionality. In addition it provides the capability to update multiple pages at once in the future simply by changing the template. The template will address the issue of providing a common menu structure throughout the site.

a. Format and Style

An initial requirement for the portal is a user-friendly interface for the portal. User friendly is a vague term, but primarily incorporates two specific issues: ease of navigation and an aesthetically pleasing site. Three simple points can be used when developing a site contrast, readability, and accessibility. With these points in mind, a successful user interface should be attainable.

Contrast refers to the proper use of colors for delivery of information and site creation. This goal is accomplished by using colors that complement each other

without being hard to distinguish. The easiest example of this is not to use a dark color on a dark color background (i.e. dark blue does not stand out on a black background. Figure 14 shows an example of good contrast next to a bad example. The color scheme for this project was chosen using the Civil Engineer Corps logo and The Fighting Seabee. The resulting color pallet is shown in Figure 15.



Figure 14. Web Contrast Example



Figure 15. CEC Portal Palette

Readability has a two-fold criterion. The first of these is to ensure the size and font selected for text to be displayed on the site is easy for users to see and read. The second half of the criteria deals with the delivery of information in an efficient manner. Users should not have to scroll anymore than necessary, and vertical scrolling is typically more desirable than horizontal scrolling. Several things go into the attainment of this goal including font selection, page layout, monitor size, and resolution. For this project, a standard web font set in Dreamweaver will be used. The font set includes Arial, Helvetica, and San-Serif. These fonts are simple and easy to read and are available on most systems in their standard configuration. The font set uses the first font if available on the system, or it works through the list until it finds one of the fonts for use on the site. The fonts are similar. This ensures that most users will see the page as the developer intended. Page layout is critical to the success of this goal. If a page is too graphic intensive, it will not have room for text that needs to be delivered. If the page has a lot of “white space,” the content will not fill up the page, and it will look void of information. Concerning monitor size and screen resolution, these vary greatly from location to

location. No one size can be counted on for all users, but it has been established, through conversations with numerous end users, that 1024 x 768 is a safe resolution to design for in most modern systems. There will be exceptions in both directions. Some users will have to scroll to see all content, and others will have too much “white space” on their page. This can be avoided by developing the site in two or three sizes, detecting the client resolution when the user accesses the site, and directing them to the appropriate site developed for their resolution. This is very intensive and will not be done for this prototype creation.

Accessibility is also important to the successful design of a website. Again, there are two aspects to this criterion. The first is providing common user access to all information on the site in an easy to locate format. These issues will be addressed in the following section. The second is accessibility for disabled persons as required by Section 508. This issue will also be addressed in a follow-on section.

b. Menus

The common menu structure of the site is critical to providing users with a positive experience when visiting a site. The menu system is the core of the web template to be created for the site. By using a common menu throughout the portal, users can quickly identify and find their way around the site. The menu items to be used for this project are Home, News, Awards, Orders, Links, and Searches. These links give access to all of the resources on the site from all pages in the site. Appendix E shows the detailed site plan and how the menu structure works within the site for navigation.

c. Section 508 Requirements

“Section 508 requires that Federal agencies' electronic and information technology is accessible to people with disabilities.” (Section 508, 2002) In light of these requirements, research was completed to identify a list of requirements mandated by this regulation. Appendix F provides a quick list identified by the web center @ NIEHS (National Institute of Environmental Health Sciences). The template for this portal was created with these requirements in mind. Most of the requirements have been met, including one of the most obvious, which is the identification of graphical objects using the HTML ALT tag. This tag displays a pop-up text box for all graphical elements on the

page. In addition, all information links presented using color were duplicated using text indication such as underlining.

A detailed analysis of the site would be required to ensure that all requirements were met. This investment of time is unnecessary at this point because this is strictly a prototype development.

7. Home Page Functionality

The primary function of the homepage is to act as a central point for the entire portal. In addition, the most recent news, awards, and orders releases will be displayed. The page is designed with the menu system on the right, a central information delivery section in the center, and quick access to information discussed in the next three sections. Figure 16 is a screen capture of the home page.

The News and Awards sections list the two most current records. The orders section shows the most recent 20 sets of orders released. All other news, awards, and orders are provided in Phase III, IV, & V. Additional functionality of the home page includes identification of the member currently logged into the system.

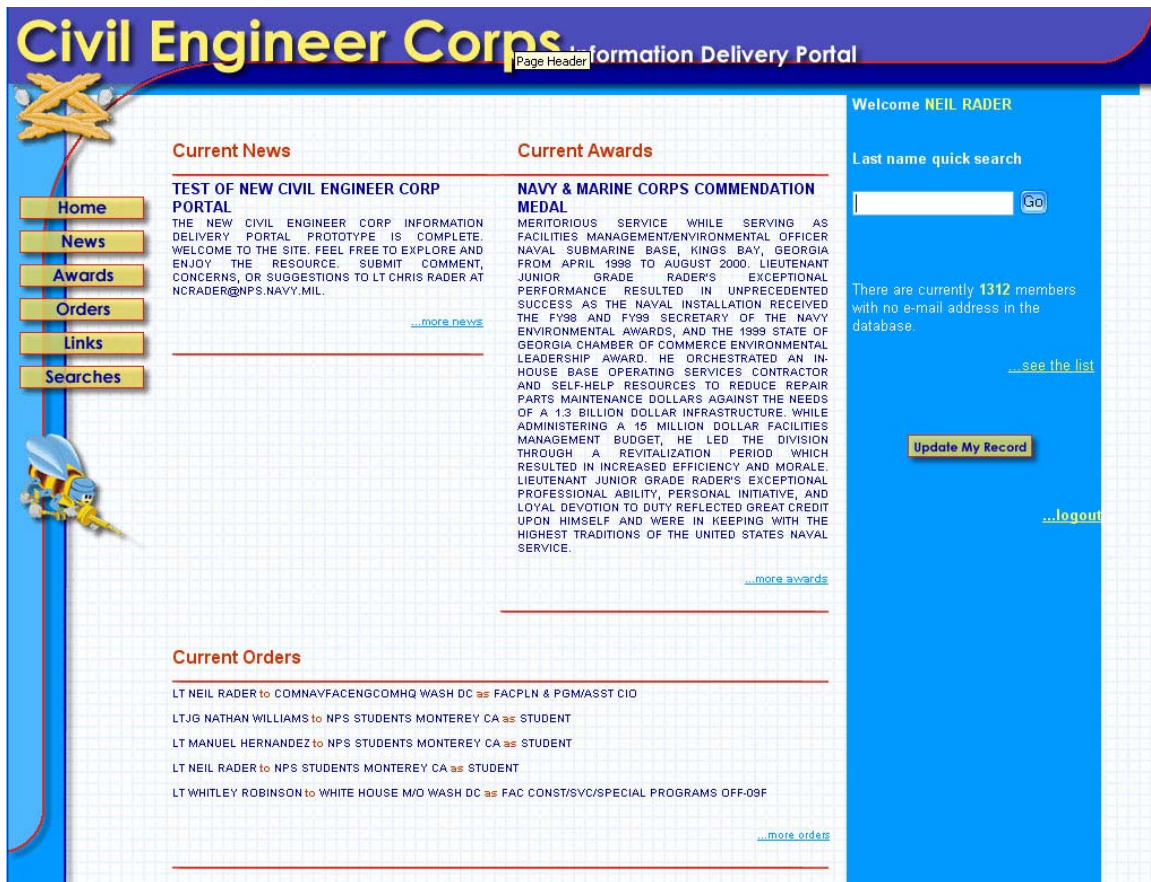


Figure 16. Portal Home Page

8. Quick Member Search

One of the most useful functions provided by this portal is the quick location of addresses, phone numbers, and e-mail addresses of other community members. With this in mind, a quick member search was added to the home page. Members can search using any portion of a person's last name. Upon submission of the request, the user is presented with a list of members meeting the search criteria. An example of the results page is shown in Figure 17. From the list of members, the user can choose to see the detailed record of the member. The detailed record contains all addresses, phone numbers, and e-mail addresses that the member has listed in the system. This page is shown in Figure 18.

Member Search Results					
Rank	Name	Year Group	Desig.	Current Activity	Detailed Record
CAPT	KING, DANIEL P	1980	5100	COMNAVFACENCOMHQ WASH DC	...GO
LCDR	KING, DOUGLAS W	1983	5105	PWC WASHINGTON DC	...GO
CAPT	KING, ROBERT H	1978	5100	CINCPAC PEARL HARBOR HI	...GO
LT	KING, SCOTT R	1995	5100		...GO
CW02	STONEKING, TERRANCE ALBIN	1990	7531		...GO
Records 1 to 5 of 5					

Figure 17. Member Search Results Page

View LT NEIL RADER's Information					
Current Assignment					
STUDENT AT NPS STUDENTS MONTEREY CA					
E-Mail Addresses			Phone Numbers		
Type	Address		Type	Number	
WORK	ncrader@nps.navy.mil		HOME	1-831-3944031 X	
HOME	ncrader@msn.com		WORK	1-831-6562911 X	
HOME	ncrader@hotmail.com		MOBILE	1-831-2772298 X	
OTHER	ncrader@vcos.com		DSN	8782911	
Addresses					
Type	Street	City	State	Zip	Country
HOME	220 TUNISIA ROAD	SEASIDE	CA	93955	UNITED STATES
WORK	1 UNIVERSITY CIRCLE	MONTEREY	CA	93943	UNITED STATES

Figure 18. Member Detail Page

7. Missing E-mail Notification

One of the primary methods of communication between CEC community managers and community members is using e-mail. Because of this, it is very important that all members maintain an active e-mail address in the system. The home page displays the current number of members who have no e-mail in the system. This count is provided by using a SQL COUNT statement to count members not contained in the EMAIL entity. Directly under the count is a link, which takes the member to a list of all members with no address in the system. From this second page, the member can choose to submit a link, if they are on the “guilty” list.

8. Member Record Updates

A final resource accessible directly from the home page is a link to the member update section of the site. After following this link, the member is presented with a member detail page of his or her own personal information. This page is similar to the member details page accessible from the quick search function, but with the addition of edit, add, and delete links. These differences in this page can be seen in Figure 19.

View LT NEIL RADER's Member Record

Current Assignment
STUDENT AT NPS STUDENTS MONTEREY CA

E-Mail Addresses [...submit a new address](#)

Type	Address	Edit/Delete
WORK	ncrader@nps.navy.mil	edit / delete
HOME	ncrader@msn.com	edit / delete
HOME	ncrader@hotmail.com	edit / delete
OTHER	ncrader@ycoos.com	edit / delete

Phone Numbers [...submit a new number](#)

Type	Number	Edit/Delete
HOME	1-831-3944031 X	edit / delete
WORK	1-831-6562911 X	edit / delete
MOBILE	1-831-2772298 X	edit / delete
DSN	8782911	edit / delete

Addresses [...submit a new address](#)

Type	Street	City	State	Zip	Country	Edit/Delete
HOME	220 TUNISIA ROAD	SEASIDE	CA	93955	UNITED STATES	edit / delete
WORK	1 UNIVERSITY CIRCLE	MONTEREY	CA	93943	UNITED STATES	edit / delete

Figure 19. Member Update Page

This section takes advantage of the session variables discussed earlier. When a member clicks the link to update member records, the site uses the current username to

identify the record to display and allow update access. In other words, when users click on this link, they will only see their own information because they are identified by their login name. Sample add, edit, and delete web forms are provided for address information. These are included in Appendix G. The forms for phone numbers and e-mail addresses are similar.

G. PHASE 3, 4, & 5 – INFORMATION DELIVERY CAPABILITIES

These phases are combined for documentation purposes because their scope is limited and some of the functionality has already been provided in the previous phase. The home page provides quick access to recent news, awards, and orders release. In addition, the home page provides access to simple member searches, and user record updates. Having provided these capabilities directly from the home page reduces the work required in these last 3 phases.

1. Phase 3 – Personnel information delivery

The requirements for this phase include:

- Allow activity searches
- Provide detailed activity search results
- Allow member searches
- Provide detailed member profile search results
- Allow billet searches

The member search capability and detailed member profile viewing have already been provided through the quick last name search for members on the home page. This capability, although very useful, is limited. The search by last name requires more information than some users may have. A user may wish to search using multiple criteria values such as rank and year group. The idea is to provide as much capability as possible. Figure 20 shows the advanced member search portion of the searches page. The values included in the search capability are first name, last name, rank, designator, and year group. The member can enter all or none of these values to be part of the search string. The results for this search are displayed in the same format as the quick member search previously identified and displayed in Figure 18.

The screenshot shows a web form titled "Member Search" on a light blue grid background. The form contains five input fields: "First Name" (text box), "Last Name" (text box), "Rank" (dropdown menu with "ADM" selected), "Designator" (text box), and "Year Group" (dropdown menu with "5100" selected). A blue "Search" button is located at the bottom right of the form.

Figure 20. Advanced Member Search Web Form

Activity searches are also a required capability for the portal. This capability has been added using the following method. A user chooses a CEC Region to search in using a provided list of options. This portion of the advanced searches page is also shown in Figure 21. This search is submitted and the user is presented with a list of all activities in that region. A results page is shown in Figure 22. The user can then select an activity from the list and will be provided with a detailed report for that activity consisting of the address, phone numbers, and all members currently assigned to billets at that command. A screen capture of the results for Naval Facilities Engineering Command is included in Figure 23.

The screenshot shows a web form titled "Activity Search" on a light blue grid background. The form contains one input field: "Region" (dropdown menu with "Naval District Washington" selected). A blue "Search" button is located at the bottom right of the form.

Figure 21. Activity Search Web Form

Activity Search Results for EFA SOUTHEAST

Name	UIC	City	State	Country
PWC JACKSONVILLE FL	68931	JACKSONVILLE	FL	UNITED STATES
ENGFLDACT SOUTHEAST JACKSONVILLE FL	44226	JACKSONVILLE	FL	UNITED STATES
NAS JACKSONVILLE FL	00207	JACKSONVILLE	FL	UNITED STATES
NAVSPTL BICMD JACKSONVILLE FL	32264	JACKSONVILLE	FL	UNITED STATES
NAVHOSP JACKSONVILLE FL	00232	JACKSONVILLE	FL	UNITED STATES
NAVAVNDEPOT JACKSONVILLE FL	65886	JACKSONVILLE	FL	UNITED STATES
HLTHCARE SUPPO JACKSONVILLE FL	68907	JACKSONVILLE	FL	UNITED STATES
COMNAVREG SE JACKSONVILLE FL	09697	JACKSONVILLE	FL	UNITED STATES
CBU FOUR ONE ZERO JACKSONVILLE FL	66671	JACKSONVILLE	FL	UNITED STATES
NAS MAYPORT FL	68709	MAYPORT	FL	UNITED STATES
NAVSTA MAYPORT FL	60201	MAYPORT	FL	UNITED STATES
CBU FOUR TWO ZERO MAYPORT FL	55162	MAYPORT	FL	UNITED STATES
NAVSUBASE KINGS BAY GA	42237	KINGS BAY	GA	UNITED STATES
EFA SE CONT OFC KINGS BAY GA	68248	KINGS BAY	GA	UNITED STATES
SWFLNT KNKS BAY GA	68733	KINGS BAY	GA	UNITED STATES
CBU FOUR ONE TWO KINGS BAY GA	66672	KINGS BAY	GA	UNITED STATES

Figure 22. Activity Search Results Page

Details for COMNAVFACENGCOMHQ WASH DC

Address

10 Digit Code: 3361002000

COMMANDER

NAVAL FACILITIES ENGINEERING COMMAND

1322 PATTERSON AVENUE SE, SUITE 1000

WASHINGTON NAVY YARD DC

20374-5065

Phone Numbers

Type

Number

COMMERCIAL

1-202-6859000

DSN

3259000

FAX

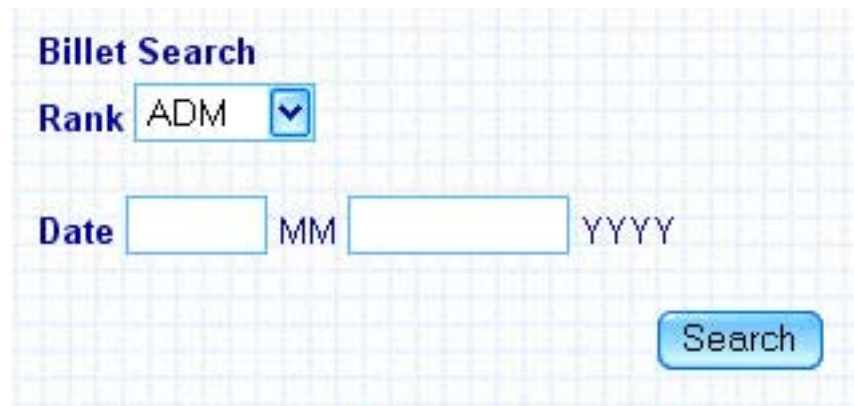
1-202-6851463

Billets

BSC	Description	Rank	Desig	Currently Assigned
01010	P&P CHIEF/COMNAVFACENGCOM/CHCIVENG	VADM	5100	RADM MICHAEL JOHNSON
01040	P&P CHIEF/VICE COMMANDER-09	RDML	5100	RADM MICHAEL LOOSE
03110	FACPLN & PGM/DEP CDR ENG OPS	RDML	5100	CAPT THOMAS BOOTHE
04010	FAC ENG/DIR NAVY PUB WORKS	CAPT	5100	CAPT ARTHUR AYARS
01110	IG/ADDU TO 91180/47326	CAPT	5100	CAPT RAYMOND MELLO
01310	PERS P&P CHIEF/DIR SEABEE READINESS	CAPT	5100	CAPT JOHN SURASH
02010	FACPLN & PGM/DIR HOUSING	CAPT	5100	CAPT THOMAS LIEBKE
03130	FACPLN & PGM/DIR CIO	CAPT	5100	CAPT DANIEL KING
05210	FAC ENG/ASST CDR PGM COORD	CAPT	5100	CAPT ANDREW BRUNHART
05110	FAC ENG/ASST CDR ENG RESRCS	CAPT	5100	CAPT ERNEST KATZWINKEL
04610	FACPLN & PGM/DIR ENG OPS	CAPT	5100	CDR JAMES JACKSON
04010	FAC ENG/DIR NAVY PUB WORKS	CAPT	5100	CAPT WILLIAM BEARY
01030	EXEC ASST TO CDR-00B	CDR	5100	LCDR JOHN KORKA
03190	FACPLN & PGM/HD CSSO	CDR	5100	CAPT PHILIP DALBY
03220	FACPLN & PGM/ASST DIR FLD OPS	CDR	5100	CAPT THOMAS CALHOUN
04630	FACPLN & PGM/ASST DIR BUS ASSMT	CDR	5100	CDR SUSAN GLOBOKAR
05320	FAC ENG/HD PW ADVOCACY	CDR	5100	CDR CAMERON MANNING
06070	FAC ENG/DIR SEABEE DOCTRINE	CDR	5100	LCDR DENNIS DUREN
06070	FAC ENG/DIR SEABEE DOCTRINE	CDR	5100	CDR VINCENT RACANELLI
06090	FAC ENG/HD HSG PPV COORD OFF	CDR	5100	CDR MICHAEL STOLL
04320	FACPLN & PGM/FLD OPS PGM OFF PAC	LCDR	5100	LT ROLFE ASHWORTH
06020	FAC ENG/BRAC POLICY MGR	LCDR	5100	LT TUAN NGUYEN
02030	FACPLN & PGM/FLD OPS PGM OFF LANT	LCDR	5100	LCDR MICHAEL ARMES
01651	FAC RSCH/NCF PGM OFF/DVG GEN	LCDR	5100	LT MICHAEL TEATES
01630	EXEC ASST/CDR CONT ENG GRP	LCDR	5100	LCDR KEVIN HUTSELL

Figure 23. Activity Detail Page

The final type of search required is a type of billet search capability. This functionality is intended to allow members to search for jobs in billets having their rank opening up during the month and year that they plan to rotate. To do this the user enters his or her rank chosen from a list of allowable values and enters the two digit month and four digit year in which they wish to search. The billet search portion of the searches page is shown in Figure 24. The results provide a list of billets and their associated activities. A Results page can be seen in Figure 25.



The image shows a web form titled "Billet Search". It contains a "Rank" dropdown menu with "ADM" selected, a "Date" section with two input fields for "MM" and "YYYY", and a "Search" button.

Figure 24. Billet Search Web Form

Billet Search Results for 8-2003

Description	Activity	Rank	Desig	Encumbent
PW OPS/ASST DIR	NAVSTA ROOSEVELT ROADS PR	LT	5100	LT KEITH MIERTSCHIN
CIV AFF/ADIC	COMUSNAVSO CIVIC ACTION DET ROOSEVELT ROADS PR	LT	5100	LCDR CARMELO MELENDEZ
FAC CONST/SVC/AROICC	ENGFLDACT MED SICILY ITALY	LT	5100	LT LEAF BALLAST
FAC CONST/SVC/AROICC	ROICC MID-PACIFIC PEARL HARBOR HI	LT	5100	LT DONALD BRUS
FAC CONST/SVC/AROICC	ROICC MID-PACIFIC PEARL HARBOR HI	LT	5100	LT JAY MURPHY
PWO (ASSISTANT)	COMNAVACT LONDON UK	LT	5100	LT RYAN TIBBETTS
PW OPS/UTILITIES OPS OFF	PWC PEARL HARBOR HI	LT	6530	LT DAVID MCALISTER
PWO/ADDU TO 17005/68442	NAVHOSP NAPLES ITALY	LT	5100	LTJG NEIL WEST

Figure 25. Billet Search Results Page

2. Phase 4 – Professional information delivery

Professional information is limited to four categories four this prototype: Seabees, Public Works, Acquisitions, and General. Providing access to information in these categories is the driving requirement for this phase. This information is stored in the form of links to external sites. When a link is chosen, the user is taken to the external site to view the relevant information. This method was chosen for display of professional information because the task of maintaining all of the information at this one site is insurmountable and unnecessary. Since most of the resources needed by CEC officers for professional development are available somewhere on the web, the external links were used. The links page is shown in Figure 26.



The screenshot shows a web page titled "Community Information Resources" with a red header bar. Below the header, there are four sections, each with a title and a search interface:

- Seabee Links**: A dropdown menu showing "CORRESPONDENCE COURSES" and a "Go" button.
- Acquisition Links**: A dropdown menu showing "NAVY ACQUISITION & BUSINESS" and a "Go" button.
- Public Works Links**: A dropdown menu showing "CECOS" and a "Go" button.
- General Links**: A dropdown menu showing "PROFESSIONAL REGISTRATION - INFO BY STATE" and a "Go" button.

The page has a light blue background with a subtle grid pattern and is framed by a red border at the top and bottom.

Figure 26. Information Resource Links Page

3. Phase 5 – Community items of interest delivery

This final phase of development is provided for the development of the delivery pages for news, awards, and orders releases. As was previously identified in the home page development phase, these pieces of information are delivered in limited quantity on the home page. The detailed news, awards, and orders pages are used to grant access to all current information. The news and awards pages deliver information in sets of five. The orders page delivers information in sets of twenty. The user can navigate through the records using the recordset navigation menu at the bottom of these pages. Examples of each of these pages are provided in Appendix H.

H. COMPLETION, TESTING, AND TROUBLESHOOTING

With all phases of development complete, final issues regarding completion of the site can be discussed. Essentially every detail of functionality provided by the site has been detailed in the previous sections. However, one item remains. Interlinking capability has been provided throughout the site. This capability allows a user to search for a member and then click on the activity that the member is stationed at and be directed to that activities detail page. The same is true for selecting member links on the activity pages. These direct the user to the member detail page. In addition, e-mail links on member detail pages are hyperlinks to call up the mailto function and call up the user's default e-mail program with an e-mail to the selected member.

Like rapid application development, testing and troubleshooting are an iterative process. Although testing was done throughout the duration of the development phases, a true test of the web portal and its interoperability with the database could not be performed until the database and portal were at a high percentage of completion. The remaining work involved in the development was an iterative use and troubleshoot method. The developer and other selected users accessed the portal and looked for errors, formatting issues, and other problems not yet identified. No major problems were found, but minor corrections to database web queries were made and some formatting adjustments were made to the site.

This concludes the development portion of the project. A CD-ROM containing the database and the entire web application is included in Appendix I. Chapter 4 addresses issues associated with the implementation of this or some similar concept for use by the community.

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IV. PROJECT IMPLEMENTATION

The prototype portal and supporting database are complete, and the issue of implementation must be discussed. This project was undertaken as a proof-of-concept to show that an information delivery tool such as a portal could be used to provide the Civil Engineer Corps with a wide variety of resources online. Providing a portal similar in concept to the one developed in this project would give members of the community access to the information it contains from any location with internet access. Portions of this project are usable as delivered in this prototype; however, others are not. In order to implement a similar working concept, several issues must be addressed. Currently, there is no plan to implement this system, but the intent of the developer is to provide a quality concept that will generate interest in pursuing a production model. In order for this to become a reality the items discussed in this chapter must first be considered.

A. ARCHITECTURE

The first issue to be addressed is the architecture to be used for hosting the database and the web portal. Two and three tier alternatives are to be considered. The current prototype utilizes a two tier architecture for the portal-database interaction, and single tier for the data management forms created in Access. The current implementation is not ideal for a working implementation.

1. Two Tier

A traditional two tier front end consists of a server and a client. Figure 27 shows a graphical representation of this model.

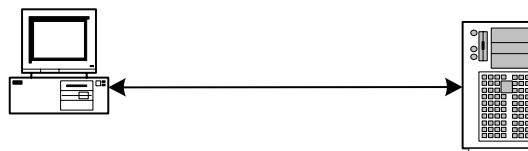


Figure 27. Two Tier Architecture

The database is stored and managed on the server, which also hosts the website. The user interface or front end is provided to the client either through a desktop application and/or website. The client makes requests to the server. On the server side, a desktop application would interact directly with the DBMS. In addition, a web interface would connect directly to the web server which would communicate with the DBMS on the same server.

2. Three Tier

The three tier architecture model provides for the separation of user, application, and data. Figure 28 shows the interaction between the tiers in this model.

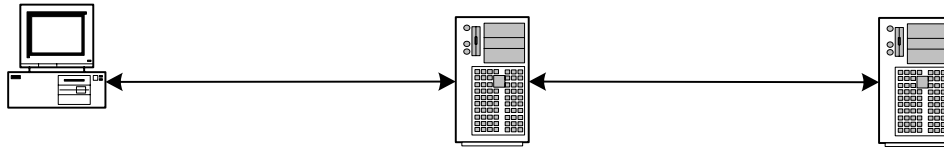


Figure 28. Three Tier Architecture

This structure is typically used in web-based applications. The user accesses the system through the client machine (i.e. a portal), the application or web server receives the requests and forwards them onto the database server, which in turn fulfills the request and returns the requested information to the client via the web server. This model is advantageous in that it separates the data from the application, which makes the information more secured.

3. Selection

The architecture used for the prototype is sufficient for that purpose, but an implemented solution would need to be more robust and allow for data separation. It is recommended that an end product would utilize a three tier architecture with all access to the data for users and managers provided through the web. The client would simply need an internet browser such as Microsoft Internet Explorer, Netscape Navigator, or Mozilla in order to access the resources. The application server could be Microsoft Internet Information Server, ColdFusion Server by Macromedia, or others. Finally, the

DBMS functionality should be provided by an industry standard product such as Oracle or SQL Server. This combination of products in the prescribed architecture would provide a robust capability with data integrity.

B. DATA MIGRATION & MAINTENANCE

There are several issues that must be addressed directly related to the data model and the existing data available for use. The project could not be successful without addressing these.

1. Data Migration

As was discussed in the database development section, the data model for this project was not entirely normalized. This was due to the format of the existing data. The data in its current form is not relational database friendly. The database in its prototype form would require manual interaction from the community detailer office. The dataset that has been entered into the functional prototype would need to be verified, updated, and completed. There is a substantial portion of the information missing. This is due to the difficulty of utilizing the existing legacy data. Also, a large portion of the personnel information is not currently stored in any database. The data populated in these entities was provided by supporters of the concept who are members of the community. Further discussion will follow on this subject in the conclusion chapter.

2. Data Maintenance

Many a wise person has said that a database is only as good as its data. There has never been a greater truth spoken. In order for a database application to be useful and productive, it must contain meaningful current data. This is a big hurdle for the proposed system. The information with respect to activity, billet, and orders is stored in a legacy system previously discussed. There is no current method of integrating the data. The system must be standalone. This creates additional work for the staff at NAVPERSCOM. The features of this site are not supported directly by the Navy at this time. However, the P1 is a community supported item and will continue to be supported in some form. Member data supported by this prototype would be maintained by the user. In order to make this effort successful, users would have to be excited about the capabilities offered through this portal. If community was interested in the use of the

site, they would participate in properly maintaining their addresses, phone numbers, and e-mail addresses.

C. SITE MIGRATION

In order to make use of the system developed in this project, the portal would have to be migrated to a permanently supported site such as the NAVFAC Information Technology Center in Port Hueneme, California. Migration of a site from one server to another often involves a certain amount of troubleshooting. This fact was encountered when moving the site from the site which it was developed on to the system where it is currently hosted. Issues that often arise during migration include database connectivity problems, file permission issues, and web server configuration conflicts. Each of these problems was encountered during the migration to the SeabeeOne server that currently hosts the site. These problems are not insurmountable. Rather, they are things which should be considered if the portal was migrated to a production server.

Since this portal will probably not be implemented in its current state, the migration issues are not critical. Any new developments based on the prototype could use the application server function of the Dreamweaver development environment to eliminate most of this problem.

D. USER MANUAL AND TRAINING

A user manual was not provided with this documentation because the project is simply a prototype and there are no immediate plans for implementation. If the system was utilized, a user manual and training would need to be provided, at a minimum to the community managers who would be maintaining the data. Proper use of the system facilitated by proper instruction ensures that the data will be kept in a proper manner. The portal has been created with simplicity in mind; therefore, little instruction should be required for members of the community who would be accessing the site. Also, most members of the community are familiar with the internet and the operation of typical sites found there. This site follows those same development guidelines and should be very familiar to users accessing the site.

E. OTHER ISSUES

1. Contractor Support

If a decision is made to proceed with this concept, a choice would have to be made regarding whether to use the prototype and enhance or create a new site from scratch. In a government environment, either of these options lend themselves to a contractor developed and supported site. Resources are available through the NAVFAC CIO office to support such an effort. A contractor could provide advanced data migration and web development capabilities, and future support for the application.

2. NMCI

In order for this project to proceed using the Dreamweaver development environment, a waiver would have to be granted since it is not currently on the list of approved software. Microsoft FrontPage is on the approved list; however, its capabilities are highly limited for web-based data applications. This issue could be moot if a contractor was used for development and support.

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V. CONCLUSION

A. LESSONS LEARNED

Throughout the course of this project, a few specific items have been identified as things to avoid in future developments of similar projects. This section is not devoted to identification of every mistake made during the development. It simply exists to point out key changes in the process that would have streamlined the development.

1. Data Modeling

The creation of the schema is critical to the success of any project involving access to a database. Obtaining a properly normalized data model is often a process of trial and error, but it must be done to the largest extent possible to help prevent future data errors and duplication. The lesson learned in this area is to begin the creation of the data model with a very open mind. This is often difficult to do, but it can make the creation of the model much easier if it is accomplished. If the developer attempts to create the model but has preconceived ideas about the data involved, obvious relationships may be missed.

As an example, the relationship between activities and billets is considered at this time. In the Civil Engineer Corps, activities have several billets associated with them. Several activities may have a Public Works Officer billet; however, the data from the NAVPERSCOM legacy system treats each of these Public Works Officer billets as a unique billet and might possibly have different short descriptions for the billet. In a proper model, this would be one billet at many activities. In other words, the relationship would be many-to-many. This fact was overlooked during the initial creation of the data model. This causes duplication of data and inefficiency in the design. In the end, this mistake was left in the design of the model for the prototype because it made population of the database substantially simpler. Without this allowance, the data would have needed to be manually scrubbed to find all billets, which were actually the same. This effort was more than allowed for in the development of this system. If a system of similar design were put into place, a decision would have to be made regarding whether

to continue to allow the model irregularity or to normalize this relationship and fix the data.

2. Lookup Confusion

During the initial creation of the database, it was decided to use lookup tables for control of the allowable values for several entity attributes such as types and categories. In the design of this portal, data for addresses, phone numbers, and e-mail addresses are to be utilized. The decision was made to use a lookup table for the allowable list of type values for these data records. Initially a single entity was created containing all possible types for each of these data types. Later, it was discovered that the use of this tables for lookup in forms, web pages, and other tables would be confusing. The reason for this was the availability of toll-free as a type of e-mail in drop-down menu lists and other similar confusing options. The correction for this problem was to create an independent lookup for each type of data: address, phone number, and e-mail address. A similar problem was discovered in the use of the category lookup for both billets and information resource web links. Both of these problems were corrected in order to eliminate the confusion.

3. Web Design

Two valuable lessons were learned with respect to approaches to web design, especially regarding pages containing dynamic content. The first of these is related to the use of web templates for the creation of a site. A template can be a curse and a blessing. The convenience of a template is that it allows you to create multiple pages with identical content on some portion of the page. This is specifically useful for creating a common navigation or menu system for the site.

The first primary lesson identified in this section is the importance of perfecting the template before the creation of additional pages. The reason for this is the need for template updates. If the template is changed after the creation of other pages, the development environment is able to update the additional pages that have been created based on the modified template. However, these updates are not always entirely successful. Specifically, the use of certain automated server behaviors and custom scripts may fail. These items sometimes prevent the proper update of the subsequent pages.

When this happens, the additional pages must be fixed one at a time. This problem was experienced late in the development of this prototype when the logout functionality was to be added to all pages throughout the site. The template was updated with a link and an automated logout script created by Dreamweaver UltraDev. The update to all pages in the site was successful, or so it seemed. Upon further inspection and testing of pages throughout the site, it was discovered that many pages had a script error caused by the logout addition. This error, if identified early in the development, could have been dealt with. In the end, this behavior was removed from every page except the homepage, which was not based on the template. Therefore, users must either close their browser or return to the homepage in order to properly logout of the site and clear their session variables.

The second web design lesson learned is to plan a page thoroughly before attempting to build it. Sketch the page, think it over, re-sketch it, and repeat until there is a high level of comfort with the design of the page and the information to be delivered. If this is done, it will prevent the need to recreate the page from scratch several times in order to obtain the desired result. This method can be extended throughout the site by sharing page designs in the creation of future pages with similar data reporting requirements. This is similar to the use of the template but in greater detail.

B. FUTURE WORK

As this project comes to completion, it is clear that the concept has been proven, but it is not yet ready for use by the community. There are several reasons for this. This section provides specific areas that should be addressed in future work to make this prototype more suited for a production system.

1. Data Standardization and Validation

An effort was made, during the creation of the data model, to restrict the users input of data wherever possible. The use of lookup tables and controlled domains were the primary method by which this was accomplished. Most data that could be constrained was; however, there are a few other areas where this capability could be provided. Specifically, the use of a lookup table for the country code prefix for phone

numbers and the country name for addresses could be standardized. This list would have to manually generated or obtained from other source.

The method by which to store phone numbers was a struggle for the developer. The existence of activities and billets in many other countries suggests that several different formats could be used. This issue could be evaluated further in order to identify a more consistent format for the storage of these numbers.

Additionally a primary area in which functionality was not provided is data validation. The Microsoft Access database forms have built in validation. They will not allow a record to be created if a required value is null. Although the program provides messages to indicate which required fields were not populated, it would be beneficial to designate theses fields on the form so that the user would not receive an error message from the system. Web form validation was not provided due to time constraints. The concept is simple. The application server checks to see if all required values are entered before submitted the information to the database. If fields are left null, the client should identify to the user that certain fields must be completed. Web pages would also benefit from clear identification of required fields. Specific formats for data to be entered into web forms could also be indicated on the page. This would help prevent database corruption caused by incorrectly formatted data.

2. Fine Tuning

Both the Access database forms and the web pages could greatly benefit from additional “fine-tuning” before this system was made accessible for use by the entire community. All forms and pages should be scrubbed to ensure that data display fields and lookup menus are sized properly to view all data in the field. This is a simple task and was partly completed during the creation of this project, but not thoroughly tested with the data set populated. One specific area suggested for improvement of the web portal is the elimination of scrolling wherever possible. The site was designed for 1024 x 768 resolution, which is available and used on many DoD computers. The development process was a learning experience for this project. The web template was created using certain sizes for HTML content tables. These tables often cause pages to show a scroll bar when there is no information stored off screen. The other cause for scrolling is the

delivery of too much dynamic content to a single formatted page. For example, the home page delivers the two newest awards and news stories along with the 20 newest sets of orders. This information typically causes the page to scroll because of the quantity of information delivered. This type of behavior could be evaluated throughout the site and eliminated where possible and desired. The elimination of all scrolling within the site makes the site much more usable for the fast-paced users that are typically accessing the web. Users want information quickly, and they do not want to be required to do a lot of “clicking” to get it.

3. Web Functionality

Additional functionality could be added to the portal in the form of award and news submissions, or additional interactive or drilldown-type search capabilities. The “items of interest” submissions were originally intended as part of this project but were eliminated due to time constraints. The system in its current state can only accept these submissions through the data management forms in Access. These submissions would be critical to the success of a production site. The variety of searches on members, activities, and billets is nearly endless. The community could be polled for additional capabilities that they would be interested in seeing added to the site. If the community were involved in future efforts such as these, it would most likely garner additional support for the concept and add to its chance of success.

4. Database Integration

The last area of future work is likely the most important. The issues associated with the current state of data in the NAVPERSCOM legacy system have been mentioned previously. In order to make this entire concept a reality, the maintenance of the data would need to be as simple as possible and require little interaction on the part of the detailing office staff. In order to make the concept viable, the detailing office would have to be willing to maintain the data. In order to prevent the duplication of data, an integration method between the legacy system and the portal database should be established. This could come in the form of a direct connection to the NAVPERSCOM system, but this option is highly unlikely. A realistic goal would be to create an import routine that would update this system using the ASCII text file output from the mainframe system. Another research project is currently underway to accomplish this

very task. The initial development of the data model for both of these projects was done simultaneously; however, additional changes are expected in model for the other research project. This research is not yet complete. When it is completed, it will meet one of the primary requirements for the progression of this portal to a working implementation. This portal research would have to be revisited upon completion of the data integration research in order to assess changes to the data model and evaluate its use with the existing portal web pages.

C. FINAL THOUGHTS

This project started with a grand vision in the mind of one student. The result is not the full-blown production model that was initially envisioned, but the research did address the primary question of what a prototype model for a Civil Engineer Corps Community portal could look like. A successful working prototype with database and website were created, and the concept was proven as a viable information delivery tool for use by the community. Portions of the portal could be implemented with little to no additional work. Other parts require additional work to implement successfully - some of which is ongoing. As stated in the beginning, the internet has become a powerful tool for providing information to almost anyone, anywhere. This project proves that this concept can be extended to this community to provide a wealth of information to a myriad of officers around the world.

APPENDIX A: P1 SAMPLE PAGES

PAGE IS REPRESENTATIVE OF FORMAT, BUT CONTAINS NO VALID DATA

Civil Engineer Corps Active Duty Personnel						
Page Number	Name	Rank	Year Group	Activity Name	PCode	Designator
34	SALTER, JEFFREY MITCHEL	LCDR	1986	NAVSUPPACT NEW	1101P	5100
100	SANDERS, SCOT T	LT	1992	ENGFLDACT MED	1101P	5100
16	SASEK, DAVID JOHN	LCDR	1987	COM THREE ONE NCR	1101P	5100
36	SCANLAN, STEVEN RAYMOND	CDR	1982	CG MCB CAMP LEJEUNE	1101P	5100
84	SCHANZE, CHRISTOPHER NMN	CAPT	1978	PACNAVFACENGCOM	1101P	5100
59	SCHILLING, LEONARD CARL	LT	1992	NAVSUBASE KINGS BAY GA	1101P	5100
83	SCOTT, BRIAN MERRITT	CDR	1981	ROICC MID-PACIFIC	1101P	5100
23	SHEEDY, WILLIAM MALCOLM	LCDR	1986	NAF ATSUGI JAPAN	1101P	5100
46	SHOEMAKER, JERRY J	LT	1992	CBC PORT HUENEME CA	1101P	5100
5	SNOW, RALPH GORDON	CDR	1983	CINCPACFLT PEARL	1101P	5100
92	STILL, AARON MICHAEL	LT	1996	NMCB FOUR	1101P	5100
85	STOLL, MICHAEL JOHN	CDR	1982	COMNAVFACENGCOMHQ	1101P	5100
60	STRATMAN, ALLAN MARK	LCDR	1986	NMCB THREE	1101P	5100
61	SURASH, JOHN E	CAPT	1976	COMNAVFACENGCOMHQ	1101P	5100
121	SYKES, MARSHALL TROUTMAN	LCDR	1988	FACILITIES PROGRAM	1101P	5100

PAGE IS REPRESENTATIVE OF FORMAT, BUT CONTAINS NO VALID DATA

EFA SOUTHEAST LISTING

Page	Activity Name	UIC	Commercial Phone
35	PWC JACKSONVILLE FL	68931	(904) 589-0943
	ENGFLDACT SOUTHEAST JACKSONVILLE FL	44226	(904) 930-9398
	NAS JACKSONVILLE FL	00207	(904) 399-9388
36	NAVSPTEL BICMD JACKSONVILLE FL	32264	(904) 939-3990
	NAVHOSP JACKSONVILLE FL	00232	(904) 849-9487
	NAVAVNDEPOT JACKSONVILLE FL	65886	(904) 653-9489
	HLTHCARE SUPPO JACKSONVILLE FL	68907	(904) 849-4985
	COMNAVREG SE JACKSONVILLE FL	09697	(904) 859-9494
37	CBU FOUR ONE ZERO JACKSONVILLE FL	66671	(904) 843-4899
	NAS MAYPORT FL	68709	(904) 985-9585
	NAVSTA MAYPORT FL	60201	(904) 849-4994
38	CBU FOUR TWO ZERO MAYPORT FL	55162	(904) 445-9488
	NAVSUBASE KINGS BAY GA	42237	(912) 938-3948
	EFA SE CONT OFC KINGS BAY GA	68248	(912) 943-3933
	SWFLNT KNGS BAY GA	68733	(912) 343-4944
39	CBU FOUR ONE TWO KINGS BAY GA	66672	(912) 839-3930

APPENDIX B: CEC BIWEEKLY SAMPLE

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[Memorandum of Understanding Signed for Rota Construction](#)
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[Address Change Information](#)
[CEC Biweekly Input Information](#)
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FY03 CEC Captain Staff Selections

The following active duty Civil Engineer Corps officers have been selected for promotion to Captain.

CDR Michael L. Blount	CDR Hugh R. Hemstreet
CDR David M. Boone	CDR Kevin A. Lindsey
CDR David M. Burnes	CDR Barry K. Loveless
CDR Francis P. Castaldo	CDR Gerald R. Manley
CDR Mason Crum	CDR Roger M. Natsuhara
CDR David L. Fleisch	CDR Michael J. O'Connor
CDR Paul T. Fuligni	CDR Eric S. Odderstol
CDR Katherine L. Gregory	CDR Robert P. Walden
CDR April F. Heinze	

The following active limited duty Civil Engineer Corps officer has been selected for promotion to Captain.

CDR David C. Phillips

The following reserve Civil Engineer Corps officers have been selected for promotion to Captain.

CDR Kenneth C. Alexander	CDR Hans Probst Jr.
CDR Paula C. Brown	CDR Ricky V. Richards
CDR Stephen E. Elrod	CDR Gregory R. Rismiller
CDR Timothy W. Hamberg	CDR Charles E. Silva
CDR Larry A. Hibner	CDR Joel E. Sinn
CDR Robert V. Huffman	CDR Theodore E. Spear
CDR Robert H. Kelly	CDR David L. Sullivan
CDR Mark E. Kistner	CDR Douglas P. Taylor
CDR Herve M. Kopciak	CDR Michael G. Ward
CDR Donald E. Kuellmer	CDR William R. Whittenberg
CDR Terrence M. Mahoney	CDR Terry L. Wilkerson
CDR Robert S. Meyer	CDR James R. Wood

NAVJAC

Seabees

NCTC

U.S. Navy

Detailer

Selection Boards

CECOS

NFACT

Perspective

Professional
Reading

Recruiting

Tricare

CDR David K. Mori
 CDR Scott A. Morris
 CDR Thomas P. Newdome

CDR Timothy G. Zakrski

The following reserve limited duty Civil Engineer Corps officer has been selected for promotion to Captain.

CDR James T. Conen

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2002 Lateral Transfer Board

Congratulations to the following officers who were recently selected for transfer to the Civil Engineer Corps:

LT Thomas M. Bestafka, Chemical Engineering, NRD New York
 LT Daryl J. Lotempio, Civil Engineering, USS BRIDGE
 LT Wallace M. Mattos, Civil Engineering, NAVSEA
 LT Daniel M. Schormann, Mechanical Engineering, NRD San Antonio
 LT Andrew J. Sullivan, Civil Engineering, JCS
 LT Robert G. Tetreault, Ocean Engineering, EWTG Lant
 LTJG Marisa K. Barrie, Mechanical Engineering, NPTU Charleston
 LTJG Angelo D. Fontanazza, Systems Engineering, USS GEORGE WASHINGTON
 LTJG Sarah L. Franson, Civil Engineering, NAVSAFECEN
 LTJG Wesley W. Hamill, Civil Engineering, USS MORISON
 LTJG Brian J. Longbottom, Civil Engineering, USS RM DAVIS
 LTJG Roberto Maldonado, Mechanical Engineering, USS ARCTIC
 LTJG Edward B. Miller, Civil Engineering, PHIBRON EIGHT
 LTJG David B. Noya, Mechanical Engineering, CSRO San Diego
 LTJG Megan M. Pagano, Engineering Science, USS HIGGINS
 LTJG Pablo F. Sierra, Aerospace Engineering, USS GONZALEZ
 ENS Jeffrey A. Brelsford, Industrial Engineering, USS HERON
 ENS Danny Cerezo, Architecture, USS ANTINETAM
 ENS Constance L. Danner, Civil Engineering, USS SPRUANCE
 ENS Matthew J. Gaudet, Mechanical Engineering, USS JUNEAU

Congratulations to the following Civil Engineer Corps who were selected for augmentation to the Regular Navy

LT Jay A. Bieszke	LT Ronald J. Jenkins
LT Deanna S. Carpenter	LT Jason G. Kranz
	LT Phillip M. Lavalley
LT Michael A. Comstock	LT Gerald C. Lowe
LT Patrick T. Connor	LT Thomas B. McLemore
LT Danny H. Cruz	LT Joseph C. Pope
LT James D. Ekberg	LTJG Brian L. Clapp
LT Lance M. Flood	LTJG Eric W. Hahn
LT Joshua J. Gamez	LTJG Marc F. Williams
LT Cassie A. Gorman	
LT Julie A. Hrdlicka	

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Items of Interest

- For the first time, "Joint" J4 Engineers from the United States Joint Forces Command (USJFCOM) attended the Contingency Engineering Seminar at the Civil Engineer Corps Officers School (CECOS) in Port Hueneme, Calif. The one-week class was designed to improve the effectiveness of those who may have to provide operational engineering support in a Joint Task Force (JTF) environment. It addressed the organization of joint task forces, DoD and civilian engineering capability, joint engineer functions, civil engineer support planning, facility acquisition management, host nation support, and capabilities of U.S. and international contingency organizations. While hosted by CECOS, the course included not only instructors from CECOS, but also a host of visiting instructors from Navy, Marine Corps, Air Force, and Army. They represented various commands such as U.S. Southern Command, Naval Facilities Engineering Command, 1st Marine Expeditionary Force and the National Emergency Preparedness Liaison Office.
- A ribbon cutting ceremony was held recently for a new wharf constructed in San Diego Bay, Calif., to support the USS NIMITZ (CVN 68) which is scheduled to make San Diego its new home sometime this fall. Besides the new wharf, a storage warehouse, equipment staging building, and a fleet recreation center was also built. The 90-foot wide by 1,300-foot long wharf runs parallel with San Diego Bay, and connects to a recently completed pier where USS JOHN S. STENNIS (CVN 74) is berthed. SOUTHWESTDIV managed the contract for the project, which is valued at approximately \$51.3 million.

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Awards

Defense Meritorious Service Medal

LT Whitley H. Robinson, CEC, USN, March 1999 to April 2002. As Officer in Charge, Special Programs Office, Metro Field Office, Policy, Plans, and Requirements, White House Military Office, established working relationships with more than 16 government departments and agencies to create unity of effort for a critical, large-scale classified project. Directed a project directed by the White House Chief of Staff, completing all actions in two weeks. Led the renovation of a Presidential command center, accelerating the schedule by 85 percent while integrating complex and changing requirements levied by senior White House Staff.

Meritorious Service Medal

CAPT Brian M. Scott, CEC, USN, June 1999 to May 2002. As ROICC, Pearl Harbor, Hawaii, executed a \$778 million acquisition program throughout Hawaii, Johnston Atoll, and Wake Island. Implemented innovative process improvements that resulted in enhanced acquisition planning and engineering integration and produced an annual savings of \$7.9 million. Led the ROICC team in executing a myriad of technically complex and time-critical projects, including the \$18 million renovation of the Commander, Pacific Fleet Headquarters and a \$32 million construction project to provide consolidated waterfront piers at Naval Station Pearl Harbor.

CDR Michael J. Stoll, CEC, USN, July 1998 to September 2001. As Public Works Officer, Naval Air Station Oceana, Virginia Beach, Va., consolidated three public works operations serving NAS Oceana, Fleet Combat Training Center Atlantic, and the Public Works Center, Virginia Beach site into a single team. Improved the combined organization's efficiency and effectiveness and reduced overhead, resulting in an annual savings of more than \$2.5 million. Orchestrated facilities preparations, including \$100 million in construction required to meet the base realignment and closure-directed receipt of 10 F/A-18 squadrons and

support functions from NAS Cecil Field, Fla.

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Military Personnel Information

CDR Kevin R. Slates to MCB Camp Lejeune, N.C.
 LCDR Bradley S. Hancock to CNET, Pensacola, Fla.
 LCDR Michael P. Oestereich to EFA NORTHEAST Contracts Office, Brunswick, Maine
 LT Karl R. Cupp to (DUINS) Colorado University, Boulder, Colo.
 LT Sarah L. Deutermann to LANTDIV Contracts Office, Sewells Point, Va.
 LT Joseph L. Greeson to 22ND NCR, Gulfport, Miss.
 LT Christopher J. Lee to NAS Sigonella, Italy
 LT Matthew P. Lesser to EFA NORTHEAST Contracts Office, Earle, N.J.
 LT Thomas J. Lyons to SOUTHWESTDIV, San Diego, Calif.
 LT Joshua B. Malkin to (DUINS) University of Maryland, College Park, Md.
 LT Jeffrey E. McCoy to NMCB FOUR, Port Hueneme, Calif.
 LT James G. Meyer to OICC MED Contracts Office, Sigonella, Italy
 LT Christopher P. Neish to (DUINS) Georgia Tech, Atlanta, Ga.
 LT Stephen H. Pitman to PACDIV DET MIDPAC, Pearl Harbor, Hawaii
 LT Russell C. Rang to LANTDIV, Norfolk, Va.
 LT Mikhael H. Ser to 22ND NCR, Gulfport, Miss.
 LT William A. Sprauer Jr. to (DUINS) University of Texas, Houston, Texas
 LT Neil E. West to (DUINS) Colorado University, Boulder, Colo.
 LT Ra Yoeun to (DUINS) University of Maryland, College Park, Md.
 LTJG Jason A. Edelberg to EFA CHES, Washington, D.C.
 LTJG Dustin Kwok to NAVACTS United Kingdom, London
 LTJG Shawn P. Pope to NAVBASE Ventura County, Point Mugu, Calif.
 ENS Erwin A. Rico to NMCB ONE, Gulfport, Miss.
 ENS Preston D. Taylor to NMCB 40, Port Hueneme, Calif.
 ENS Erik P. Ulmen to 22ND NCR, Gulfport, Miss.

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CEC Biweekly Address Changes

Active duty, reserve, and retired e-mail addresses may be updated online. For active duty Civil Engineer Corps officers, visit www.navfac.navy.mil/cec-list/active.cfm. For reserve Civil Engineer Corps officers, visit www.navfac.navy.mil/cec-list/reserve.cfm. Retired CEC officers can now provide their e-mail addresses to receive the electronic CEC Biweekly by visiting www.navfac.navy.mil/cec-list/retire.cfm. All CEC officers should keep their e-mail addresses current within the system as these e-mail addresses will also be used to disseminate other official information.

For active duty officer address changes, please contact Dennis Potter at DSN 882-4031, commercial (901) 874-4031, or send an e-mail to p4413s@persnet.navy.mil. For reserve officer address changes, contact John Anderson at (202) 685-9014 or e-mail at andersonjf@navfac.navy.mil.

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CEC Biweekly Input Information

<http://www.navfac.navy.mil/pao-graphics/CECBiweekly020607.htm>

6/15/2002

If you have information you would like to submit to the CEC Biweekly, mail to the address below or send an e-mail to Drema McCoy at mccoydm@navfac.navy.mil. You may also call her at DSN 325-9008, commercial (202) 685-9008 or fax at (202) 685-1484. If you have award information, please fax or mail a copy of the signed citation.

CEC Biweekly
Naval Facilities Engineering Command
1322 Patterson Ave. SE, Suite 1000
Washington Navy Yard, D.C. 20374-5065

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APPENDIX C: DATABASE SCHEMA

Entity Name		Description				
ACTIVITY		This entity contains information related to commands to which Civil Engineer Corps officers are assigned.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
ActivityID	✓		Uniquely identifies activity	Integer	Autonumber	✓
Name			Command name	VarChar (75)		✓
UIC			UIC	VarChar (10)		✓
Claimancy			Claimancy	VarChar (2)		
Region			NAVFAC Region	VarChar (25)	Lookup Table	✓
Street 1			1st line of street address	VarChar (50)		✓
Street 2			2nd line of street address	VarChar (50)		
Street 3			3rd line of street address	VarChar (50)		
Street 4			4th line of street address	VarChar (50)		
City			City	VarChar (25)		✓
State			State	VarChar (2)	Lookup Table	✓
Zip			Zip code	VarChar (5)		✓
ZipPlusFour			Plus 4 zip code	VarChar (4)		
Country			Country	VarChar (25)		
10DigitCode			Unique 10 digit code	VarChar (10)		✓
Entity Name		Description				
ACTIVITY_PHONE		This entity contains phone number information for activities.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
ActivityPhoneID	✓		Uniquely identifies phone number	Integer	Autonumber	✓
ActivityID		✓	Foreign key property information provided in foreign table			✓
Type			Type of number	VarChar (15)	Lookup Table	✓
CountyCode			Country code	VarChar (5)		
AreaCode			Area Code	VarChar (5)		
Number			Phone Number	VarChar (20)		✓
Extension			Extension	VarChar (8)		
Entity Name		Description				
MEMBER		This entity contains information related to members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
MemberID	✓		Uniquely identifies member	Integer	Autonumber	✓
FirstName			First name	VarChar (25)		✓
MiddleName			Middle initial	VarChar (2)		
LastName			Last name	VarChar (25)		✓
NickName			Go-by name	VarChar (25)		
Suffix			Name suffix	VarChar (5)	Lookup Table	
SSN			Social Security Number	VarChar (9)		✓
Rank			Rank	VarChar (7)	Lookup Table	✓
Designator			Designator	VarChar (7)	Lookup Table	✓
Race			Race	VarChar (1)	Lookup Table	
Sex			Sex	VarChar (1)	Lookup Table	
YearGroup			Year Group	Integer (4)	Lookup Table	✓
Username			Portal Username	VarChar (20)		
Password			Portal Password	VarChar (20)		
UserLevel			Portal User Access Level	VarChar (15)	Administrator User	

Entity Name		Description				
ADDRESS		This entity contains address information for members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
AddressID	✓		Uniquely identifies addresses	Integer	Autonumber	✓
MemberID		✓	Foreign key property information provided in foreign table			✓
Type			Type of address	VarChar (15)	Lookup Table	✓
Street 1			1st line of street address	VarChar (50)		✓
Street 2			2nd line of street address	VarChar (50)		
Street 3			3rd line of street address	VarChar (50)		
Street 4			4th line of street address	VarChar (50)		
City			City	VarChar (25)		✓
State			State	VarChar (2)	Lookup Table	✓
Zip			Zip	VarChar (5)		✓
ZipPlusFour			Plus 4 zip code	VarChar (4)		
Country			Country	VarChar (25)		
Entity Name		Description				
PHONE		This entity contains phone information for members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
PhoneID	✓		Uniquely identifies phone number	Integer	Autonumber	✓
MemberID		✓	Foreign key property information provided in foreign table			✓
Type			Type of number	VarChar (15)	Lookup Table	✓
CountryCode			Country code	VarChar (5)		
AreaCode			Area Code	VarChar (5)		
Number			Phone Number	VarChar (20)		✓
Extension			Extension	VarChar (8)		
Entity Name		Description				
EMAIL		This entity contains e-mail addresses for members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
EMailID	✓		Uniquely identifies phone number	Integer	Autonumber	✓
MemberID		✓	Foreign key property information provided in foreign table			✓
Type			Type of e-mail	VarChar (15)	Lookup Table	✓

Entity Name		Description				
MEMBER_BILLET		This entity contains information necessary to relate community members to billets.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
MemberID	✓	✓	Foreign key property information provided in foreign table			✓
BilletID	✓	✓				
ReportDate			Report date	Date/Time	MM/DD/YYYY	✓
PRD			Project Rotation Date	Date/Time	MM/DD/YYYY	✓
DisplayDate			Date to display on portal	Date/Time	MM/DD/YYYY	✓
Entity Name		Description				
MEMBER_QUALIFICATION		This entity contains information necessary to relate qualifications to members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
MemberID	✓	✓	Foreign key property information provided in foreign table			✓
QualificationID	✓	✓				
Entity Name		Description				
MEMBER_PCODE		This entity contains information necessary to relate pcodes to members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
MemberID	✓	✓	Foreign key property information provided in foreign table			✓
PCodeID	✓	✓				
Entity Name		Description				
BILLET		This entity contains information related to billets for members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
BilletID	✓		Uniquely identifies billet	Long Integer	Autonumber	✓
ActivityID		✓	Foreign key property information provided in foreign table			✓
PCodeID		✓				
BSC			Billet Sequence Code	VarChar (10)		✓
Description			Short name of billet	VarChar (50)		✓
Category			Billet Category	VarChar (25)	Lookup Table	✓
Rank			Rank required for billet	VarChar (7)	Lookup Table	
Designator			Designator required for billet	VarChar (7)	Lookup Table	
Active			Indicates billet active/inactive	Boolean	Yes No	✓
StartDate			Start date for billet availability	Date/Time	MM/DD/YYYY	
EndDate			End date for billet availability	Date/Time	MM/DD/YYYY	
Entity Name		Description				
BILLET_QUALIFICATION		This entity contains information necessary to relate qualifications to billets.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
MemberID	✓	✓	Foreign key property information provided in foreign table			✓
QualificationID	✓	✓				
Status			Indicates primary or secondary qualification code for billet	VarChar (10)	Primary Secondary	✓

Entity Name		Description				
PCODE		This entity contains pcode information for members and billets of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
PCodeID	✓		Uniquely identifies a pcode	Integer	Autonumber	✓
PCode			Professional Code	VarChar (7)		✓
Description			Professional Code Description	VarChar (5)		✓
Entity Name		Description				
QUALIFICATION		This entity contains qualification information for members and billets of the the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
QualificationID	✓		Uniquely identifies a qualification	Integer	Autonumber	✓
AQD			Qualification Code	VarChar (7)		✓
Description			Description of qualification	VarChar (50)		✓
Entity Name		Description				
AWARDS		This entity contains awards received by members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
AwardID	✓		Uniquely identifies award	Integer	Autonumber	✓
MemberID		✓	Foreign key property information provided in foreign table			✓
DisplayDate			Portal display date	Date/Time	MM/DD/YY	✓
Award			Award name	VarChar (50)		✓
Description			Detailed award description	Memo		✓
Entity Name		Description				
LINKS		This entity contains links to professional information needed by members of the Civil Engineer Corps.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
LinkID	✓		Uniquely identifies a link	Integer	Autonumber	✓
Category			Information category	VarChar (25)	Lookup Table	✓
URL			World Wide Web URL	Hyperlink		✓
Entity Name		Description				
NEWS		This entity contains news updates for Civil Engineer Corps community items of interest.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
NewsID	✓		Uniquely identifies news update	Integer	Autonumber	✓
MemberID		✓	Foreign key property information provided in foreign table			✓
DisplayDate			Portal display date	Date/Time	MM/DD/YY	✓
News			News update	Memo		✓

Entity Name		Description				
lookupCATEGORY		This entity contains lookup values for categories of billets.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
CategoryID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Category			Billet category	VarChar (25)	Seabee Combat Warfare Acquisition Professional Public Works Management Staff General School	✓
Entity Name		Description				
lookupCATEGORYlink		This entity contains lookup values for categories of web links.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
CategoryID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Category			Web links category	VarChar (50)	Seabees Acquisitions Public Works General	✓
Entity Name		Description				
lookupDESIGNATOR		This entity contains lookup values for military designators.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
Designator ID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Designator			Alphanumeric designator code	VarChar (7)	5100, 5105, 6530, 6531, 6532, 7531, 7535, 7530, 1110, 1115, 1120, 1125, 1165, 1175, 1310, 1315, 1320, 1390, 1395	✓
Description			Description of the designator	VarChar (100)	ACTIVE DUTY CIVIL ENGINEER CORPS OFFICER ACTIVE DUTY RESERVE CIVIL ENGINEER CORPS OFFICER CIVIL ENGINEER CORPS LIMITED DUTY OFFICER (LDO) CIVIL ENGINEER CORPS LIMITED DUTY OFFICER (LDO) CIVIL ENGINEER CORPS LIMITED DUTY OFFICER (LDO) CIVIL ENGINEER CORPS CHIEF WARRANT OFFICER (CWO) CIVIL ENGINEER CORPS CHIEF WARRANT OFFICER (CWO) CIVIL ENGINEER CORPS CHIEF WARRANT OFFICER (CWO) SURFACE WARFARE QUALIFIED URL OFFICER SURFACE WARFARE QUALIFIED URL OFFICER SUBMARINE WARFARE QUALIFIED URL OFFICER SUBMARINE WARFARE QUALIFIED URL OFFICER URL OFFICER IN TRAINING FOR SURFACE WARFARE QUALIFICATION URL OFFICER IN TRAINING FOR SUBMARINE WARFARE QUALIFICATION URL OFFICER QUALIFIED AS A NAVAL AVIATOR URL OFFICER QUALIFIED AS A NAVAL AVIATOR URL OFFICER QUALIFIED AS A NAVAL FLIGHT OFFICER URL OFFICER IN TRAINING AS A NAVAL AVIATOR URL OFFICER IN TRAINING AS A NAVAL AVIATOR	✓
Importance			Used for sorting of designator by order of community importance	Integer		✓

Entity Name		Description				
lookupRACE		This entity contains lookup values for race.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
RaceID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Race			Text description of race	VarChar (7)	White/Caucasian Black/African American Amercian Indian/Alaskan Native Asian American/Pacific Islander Hispanic/Latino/Latina Other Undeclared	✓
ShortRace			One letter code for race	VarChar (2)	W, B, I, A, H, O, X	✓
Entity Name		Description				
lookupRANK		This entity contains lookup values for rank.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
RankID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Rank			Text description of rank	VarChar (7)	ENS, LTJG, LT, LCDR, CDR, CAPT, RDML, RDMU, VADM, ADM, CWO1, CWO2, CWO3, CWO4	✓
Imporance			Allows for sorting of rank by seniority	Integer		✓
Entity Name		Description				
lookupREGION		This entity contains lookup values for region.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
RegionID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Region			Civil Engineering Corp Division	VarChar (30)	Naval District Washington Atlantic Division EFA Mediterranean EFA Chesapeake EFA Northeast Southern Division EFA Southeast EFA Midwest Southwest Division EFA West EFA Northwest Pacific Division	✓
Entity Name		Description				
lookupSEX		This entity contains lookup values for sex.				
		Properties				
Field	PK	FK	Description	Type (length)	Allowable Values	Required
SexID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Sex			Biological identification from birth	VarChar (1)	M F	✓

Entity Name		Description				
lookupSTATE		This entity contains lookup values for state.				
Field	PK	FK	Description	Type (length)	Properties	Required
					Allowable Values	
StateID	✓		Uniquely identifies a category	Integer	Autonumber	✓
State			State identification	VarChar (2)	AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY, AW, AP, AA	✓
Entity Name		Description				
lookupSUFFIX		This entity contains lookup values for type of suffix.				
Field	PK	FK	Description	Type (length)	Properties	Required
					Allowable Values	
SuffixID	✓		Uniquely identifies a category	Integer	Autonumber	✓
Suffix			Suffix identification	VarChar (5)	I II III IV JR SR	

APPENDIX D: MANAGEMENT TOOL SCREEN SHOTS

Shore Activity Management

Activity
COMNAVFACENGCOMHQ WASH DC

Street Address
COMMANDER

City
WASHINGTON NAVY YARD

UIC 00025 **Claimancy** **10 Digit Code** 3361-0020-00

Street Address
NAVAL FACILITIES ENGINEERING COMMAND

State DC **Zip** 20374 5065

Region
NAVAL DISTRICT WASHINGTON

Country
UNITED STATES

Phone Numbers

Type	Country Code	Area Code	Number	Extension
COMMERCIAL	1	202	6859000	
DSN			3259000	
FAX	1	202	6851463	
*	1			

Record: 1 of 450

Shore Billet Management

Name
STUDENT

Designator: **PCode** 0089T

Activity
NPS STUDENTS MONTEREY CA

Rank

UIC 31405 **BSC** 99990 **Active** ☒

Category
SCHOOL

Billet Start Date **Billet End Date**

Billet Qualifications

Qualification	Description	Status

Currently Assigned

Rank	FirstName	LastName	Report Date	PRD
LT	PHILLIP	CYR	1/1/2001	7/31/2002
LT	BRIAN	WEINSTEIN	8/1/2000	9/30/2002
LT	NEIL	RADER	9/30/2000	6/21/2002
LT	MANUEL	HERNANDEZ	9/1/2001	9/30/2003
LTJG	NATHAN	WILLIAMS	9/1/2001	9/30/2003

Record: 1194 of 1266

Member Orders Management


Last Name	First Name
RADER	NEIL

Billet	Report Date	PRD
STUDENT	9/30/2000	6/21/2002

Activity	Display Date
NPS STUDENTS MONTEREY CA	6/1/2002

Record: 873 of 1191

Information Resource Management



Civil Engineer Corps
Information Delivery Portal

Information Delivery Tool
Data Management System

- ☒ Web Link Management
- ☐ Award Submission Management
- ☐ News Submission Management
- ☐ Return to Main Menu

Web Link Management

Category
Seabees
Description
GENERAL
URL
http://www.seabee.navy.mil

Record: 2 of 15

Award Submission Management

Award

NAVY & MARINE CORPS COMMENDATION MEDAL

Description

Meritorious service while serving as Facilities Management/Environmental Officer Naval Submarine Base, Kings Bay, Georgia from April 1998 to August 2000. Lieutenant Junior Grade Rader's exceptional performance resulted in unprecedented success as the Naval installation received the FY98 and FY99 Secretary of the Navy environmental awards, and the 1999 state of Georgia chamber of commerce environmental leadership award. He orchestrated an in-house base operating services contractor and self-help resources to reduce repair parts maintenance dollars against the needs of a 1.3 billion dollar infrastructure. While administering a 15 million dollar facilities management budget, he led the division through a revitalization period which resulted in increased efficiency and morale. Lieutenant Junior Grade Rader's exceptional professional ability, personal initiative, and loyal devotion to duty reflected great credit upon himself and were in keeping with the highest traditions of the United States Naval service.

Recipient

RADER

NEIL

Display Date

9 /1 /2000

Record:
11
of 11

News Submission Management

Title

Date Set for Washington, D.C., NAVFAC/CEC/Seabee Anniversary Ball

News

The Washington, D.C., NAVFAC/CEC/Seabee Anniversary Ball will be held on 9 March at the Crystal Gateway Marriott in Arlington, Va. It will mark the 160th anniversary of the Naval Facilities Engineering Command, the 135th of the Civil Engineer Corps, and the 60th of the Seabees. As is tradition, NAVFAC HQ events will begin at 11:00 with the 28th annual Seabee Memorial Service at the Seabee Memorial in Arlington.

During the ball, the Rear Admiral Lewis B. Combs and the Steelworker Second Class Robert B. Stethem awards will be presented to individuals who have made outstanding contributions to the legacy of the Seabees. To pay special recognition to the Seabees' 60th birthday, the Seabee veterans who helped pave our way to victory during World War II will be honored.

Submitted By

RADER

NEIL

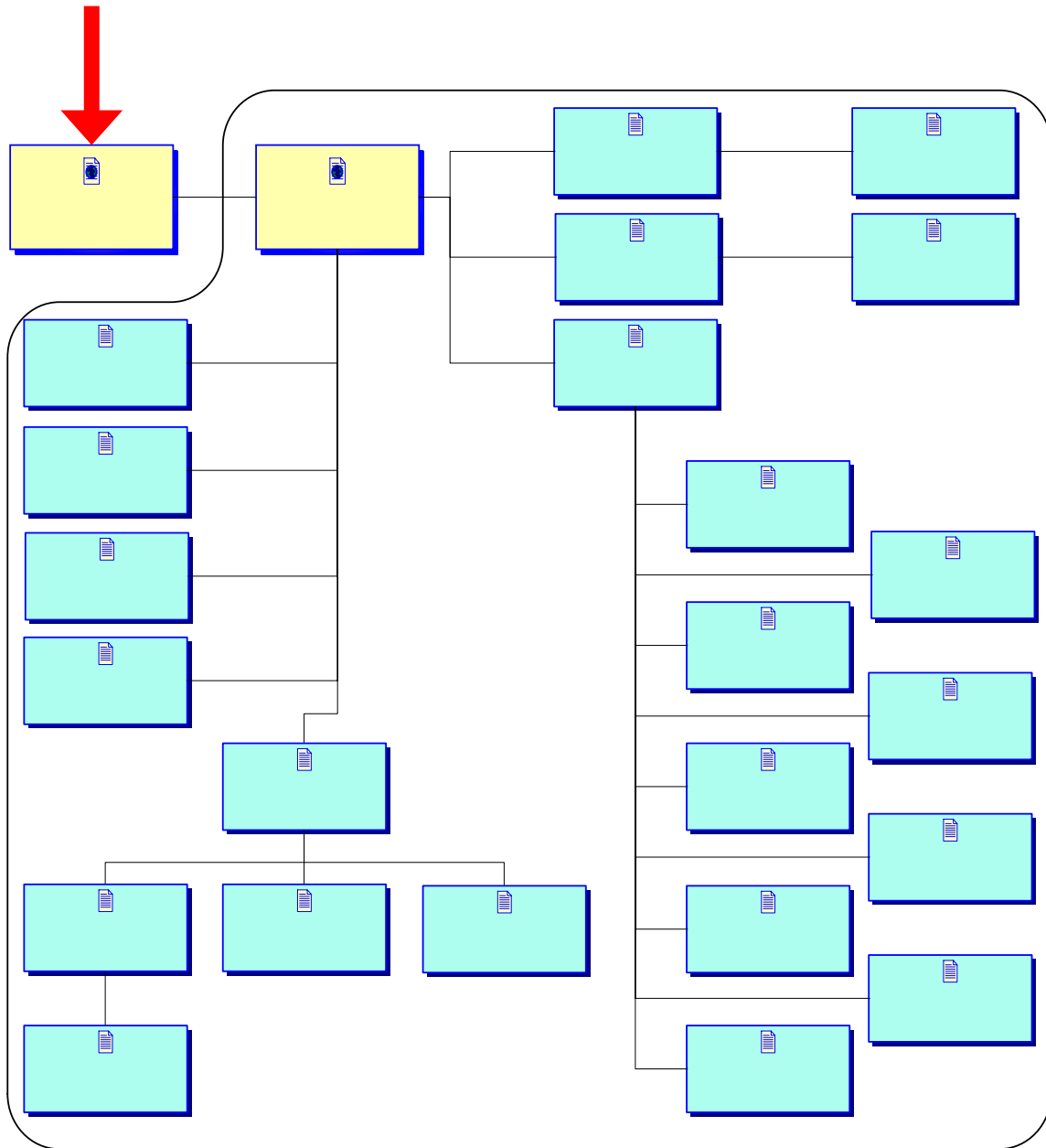
Display Date

6 /1 /2002

Record:
5
of 18

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APPENDIX E: DETAILED SITE PLAN



Login Page

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APPENDIX F: SECTION 508 SHORT LIST

1. A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).
2. Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.
3. Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.
4. Documents shall be organized so they are readable without requiring an associated style sheet.
5. Redundant text links shall be provided for each active region of a server-side image map.
6. Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
7. Row and column headers shall be identified for data tables.
8. Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.
9. Frames shall be titled with text that facilitates frame identification and navigation.
10. Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.
11. A text-only page, with equivalent information or functionality, shall be provided to make a web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.
12. When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.
13. When a web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with §1194.21(a) through (l).
14. When electronic forms are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.
15. A method shall be provided that permits users to skip repetitive navigation links.
16. When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

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APPENDIX G: SAMPLE MEMBER UPDATE FORMS

Submit an Address

Type: HOME

Street1: 220 TUNISIA ROAD

Street 2:

Street 3:

Street 4:

City: SEASIDE

State: CA

Zip: 93955

Zip +4:

Country: UNITED STATES

Edit Address

Type: HOME

Street 1: 220 TUNISIA ROAD

Street 2:

Street 3:

Street 4:

City: SEASIDE

State: CA

Zip: 93955

Country: UNITED STATES

Delete Address

Are you sure you want to delete this HOME address from the database?

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APPENDIX H: SAMPLE INFORMATION DELIVERY TOOLS

All Current News

Test of New Civil Engineer Corp Portal

The new Civil Engineer Corp Information Delivery Portal prototype is complete. Welcome to the site. Feel free to explore and enjoy the resource. Submit comment, concerns, or suggestions to LT Chris Rader at norader@nps.navy.mil.

EFA CHES ROICC Office Receives CMAA Award

The EFA CHES ROICC office recently received the Construction Management Association of America's (CMAA) National Capital Chapter, 2001 Project Achievement Award for the newly constructed Glenn Warner Soccer Facility at the U.S. Naval Academy. The award is provided annually to the construction management entity that best exemplifies professionalism and excellence in the management of the construction process. The \$4.5 million project is a one story 17,000 square foot building consisting of a home team wing and a visitor wing on either side of a two-story high domed memorial lobby. The memorial lobby is the focal point for displays and was constructed to a grade of finish to host formal functions. The wings provide coaches offices, locker rooms, laundry facilities, training room and shower facilities. A concession area and a ticket booth were also incorporated into the visitors wing. ROICC Annapolis led the project team in setting up a master schedule, developing a procurement strategy, establishing project performance criteria, selecting the design-builder, design development and construction of the facility. The project was delivered eight months early and finished by original contract completion date. The tight schedule led ROICC Annapolis to propose design-build delivery system which allowed completion of the project in 13 months vice 21 months to design-bid-build and use of the facility for the 2001 soccer season vice the normal design-bid-build approach that would have delayed its use until the 2002 season. The project will compete for the National CMAA Achievement Award due to be awarded August 02.

PACDIV Completes Sewer Force Main Installation

PACDIV and ROICC Pearl Harbor recently installed a new sewer force main from Ford Island to the Naval Shipyard at Pearl Harbor. The project, which required long distance, horizontal drilling in soft soil at the bottom of the harbor, will provide approximately 1,820 meters of 500mm high-density polyethylene (HDPE) pipe to transmit wastewater from Ford Island to the Naval Shipyard. The project will also upgrade the pumping capacity of the existing Ford Island pumping station project. The drilling began on February 1 and seven hours later, an equal length of 20-inch high-density polyurethane pipe was placed beneath Pearl Harbor waters. The excavation wasn't the longest attempted but it is important because of the difficulty keeping a drill on the correct path in soft soil. The effort is part of a \$5.7 million military construction (MILCON) project that broke ground in December 2001 and has an estimated completion date of July 2003. ROICC Pearl Harbor will administer the contract.

Seabee Memorial Scholarship Applications Due 15 April

Do you know of someone with ties to the Seabees who may be in need of scholarship assistance for college tuition? The Seabee Memorial Scholarship Association (SMSA) may be able to help. The 2002 SMSA award process is set to begin with the acceptance of scholarship applications which are due no later than 15 April 2002. Eligible applicants are sons, daughters, stepchildren, and grandchildren of regular, reserve, retired, or deceased officers or enlisted members who have served or who are now serving with the Naval Construction Force (Seabees) or Navy Civil Engineer Corps, or who have served, but have since been honorably discharged. The basis of award is financial need, scholastic aptitude, leadership, and good citizenship. Scholarships are for four-year bachelor's degrees, and are not available for part time or graduate study. The annual grant is renewable for up to four years provided the recipient maintains eligibility. Applications may be found on the SMSA website at www.seabee.org. Completed applications must be received or postmarked by 15 April 2002 and mailed to: SMSA, P.O. Box 6574, Silver Spring, MD 20916. Applicants will receive notification of application receipt, and subsequent results in July.

PACDIV Breaks Ground on Environmental Project

PACDIV broke ground 7 February on a military construction project that will ultimately improve the water quality in the Pearl Harbor estuary. The project will construct a deep ocean outfall that will discharge treated effluent from the wastewater treatment plant at Fort Kamehameha on Hickam Air Force Base through a multiport diffuser into open coastal waters. PACDIV awarded the \$21.7 million contract in June 2001 to Healy Tibbitts Builders, Inc., of Aiea. The existing outfall at Fort Kamehameha discharges into the Pearl Harbor estuary, which is classified as a water quality limited segment (WQLS) by the State Department of Health. Under this designation, no increase of wastewater discharges to the estuary is allowed. Relocation of the discharge pipe to open coastal waters will eliminate discharge to the WQLS of Pearl Harbor and the associated future permit limitations or violations. The contractor will install about 12,500 feet of 48-inch high-density polyethylene pipe using environmentally sensitive construction practices. Beginning at the shoreline near the existing treatment plant, a trench will be excavated across a shallow reef area using heavy construction equipment. The excavated material will be placed next to the trench, providing access for pipe installation. The new outfall pipe will be linked to the existing line allowing the treated effluent to be discharged into the water at a depth of about 150 feet.

Records 1 to 5 of 19

[Next](#) [Last](#)

All Current Awards

NAVY & MARINE CORPS COMMENDATION MEDAL

Meritorious service while serving as Facilities Management/Environmental Officer Naval Submarine Base, Kings Bay, Georgia from April 1998 to August 2000. Lieutenant Junior Grade Rader's exceptional performance resulted in unprecedented success as the Naval installation received the FY98 and FY99 Secretary of the Navy environmental awards, and the 1999 state of Georgia chamber of commerce environmental leadership award. He orchestrated an in-house base operating services contractor and self-help resources to reduce repair parts maintenance dollars against the needs of a 1.3 billion dollar infrastructure. While administering a 15 million dollar facilities management budget, he led the division through a revitalization period which resulted in increased efficiency and morale. Lieutenant Junior Grade Rader's exceptional professional ability, personal initiative, and loyal devotion to duty reflected great credit upon himself and were in keeping with the highest traditions of the United States Naval service.

Navy and Marine Corps Achievement Medal

LTJG Andrew J. Shinka, CEC, USNR, April 2000 to February 2002. As ARDICC, Marine Corps Base, Camp Lejeune, N.C., executed 20 contracts valued at more than \$68 million and was responsible for \$17 million work in place. Led the construction of the recon facility, renovation of 11 bachelor enlisted quarters, and completion of two new schools.

Navy and Marine Corps Achievement Medal

LT Russell J. Mattson, CEC, USN, June 2001 to December 2001. As Project Manager, NFESC, led the \$2 million explosive handling wharf repair project at Naval Submarine Base, Bangor, which directly supported national strategic assets during a period of immense security and operational constraints. Ensured that the project stayed on schedule, within budget, and was completed with the highest standards of quality while minimizing operational impact.

Navy and Marine Corps Commendation Medal

LT Daniel W. Grippo, CEC, USN, March 2000 to November 2001. As Assistant Public Works Officer, Naval Air Engineering Station, Lakehurst, N.J., led 134 civilians and 12 military personnel in the maintenance, repair, and construction of more than \$900 million of base facilities, resulting in more than \$1.5 million in annual contract savings and efficiencies and a 20 percent reduction in contract lead-time. Led the facility support efforts of more than 100 base and community volunteers while saving more than \$100,000 in costs and providing outstanding service for more than 400,000 visitors.

Navy and Marine Corps Achievement Medal

ENS Theodore J. Foster, CEC, USNR, October 2001 to November 2001. As ARDICC, National Naval Medical Center, Bethesda, Md., performed admirably as the Acting RDICC and Acting Supervisory General Engineer in the wake of the events of September 11. Took the helm firmly in the absence of his supervisor and guided the office through difficult year end acquisitions while personally managing 16 high visibility construction projects valued at more than \$21 million.

Records 1 to 5 of 11

[Next](#) [Last](#)

All Current Orders

LT Neil Rader to COMNAVACENGCOMHQ WASH DC as FACPLN & PGM/ASST CIO
LTJG Nathan Williams to NPS STUDENTS MONTEREY CA as STUDENT
LT Manuel Hernandez to NPS STUDENTS MONTEREY CA as STUDENT
LT Neil Rader to NPS STUDENTS MONTEREY CA as STUDENT
LT Whitley Robinson to WHITE HOUSE M/O WASH DC as FAC CONST/SVC/SPECIAL PROGRAMS OFF-09F
CDR David Boone to WHITE HOUSE M/O WASH DC as FACPLN & PGM/SPEC PGM OFF WHMO M0010013
LT Thomas Hunt to COMNAVACENGCOMHQ WASH DC as MPWR PLN/MIL MPWR OFF
LT Steven Blanton to COMNAVACENGCOMHQ WASH DC as AIDE/TO THE COMMANDER - 00A
LCDR THEODORE POSUNIAK to COMNAVACENGCOMHQ WASH DC as FAC ENG/HD CB POL & DOCTRINE
LT Holly Johnson to COMNAVACENGCOMHQ WASH DC as FAC RSCH/SEALIFT SUPP & MPF(E)
LT TUAN NGUYEN to COMNAVACENGCOMHQ WASH DC as FAC ENG/BRAC POLICY MGR
LT Rolfe Ashworth to COMNAVACENGCOMHQ WASH DC as FACPLN & PGM/FLD OPS PGM OFF PAC
LCDR Michael Armes to COMNAVACENGCOMHQ WASH DC as FACPLN & PGM/FLD OPS PGM OFF LANT
LT Michael Teates to COMNAVACENGCOMHQ WASH DC as FAC RSCH/NCF PGM OFF/DVG GEN
LCDR Kevin Hutsell to COMNAVACENGCOMHQ WASH DC as EXEC ASST/CDR CONT ENG GRP
CDR MICHAEL STOLL to COMNAVACENGCOMHQ WASH DC as FAC ENG/HD HSG PPV COORD OFF
CDR Cameron Manning to COMNAVACENGCOMHQ WASH DC as FAC ENG/HD PW ADVOCACY
CDR Susan Globokar to COMNAVACENGCOMHQ WASH DC as FACPLN & PGM/ASST DIR BUS ASSMT
CAPT Thomas Calhoun to COMNAVACENGCOMHQ WASH DC as FACPLN & PGM/ASST DIR FLD OPS
CAPT Philip Dalby to COMNAVACENGCOMHQ WASH DC as FACPLN & PGM/HD CSSO

Records 1 to 20 of 24

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APPENDIX I: PROJECT CD-ROM

THE PROJECT CD-ROM CAN BE FOUND
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